

Critical Minerals and the Energy Transition



Governance, Transparency and Accountability in Africa

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Executive Summary ▼



The global transition to clean energy has driven an unprecedented demand for critical minerals, including lithium, cobalt, nickel, and rare earth elements, which are essential for technologies such as batteries, wind turbines, and solar panels. Africa, endowed with vast deposits of these minerals, has a unique opportunity to become a key player in the global energy transition. However, significant governance challenges threaten the continent's ability to fully harness the economic and developmental benefits of its mineral wealth. Corruption, weak regulatory oversight, illicit financial flows, and environmental degradation continue to undermine transparency and accountability in the extractive sector. Without strategic reforms, Africa risks falling into the familiar cycle where resource abundance leads to economic disparities and environmental destruction rather than sustainable development.

This report, commissioned by the Centre for Journalism Innovation and Development (CJID), critically examines the governance landscape of

Africa's critical mineral sector, with a particular focus on Nigeria, Ghana, Democratic Republic of Congo (DRC) and Mozambique. Through a detailed analysis of policy frameworks, regulatory mechanisms, and industry best practices, the study highlights existing gaps in transparency, institutional effectiveness, and revenue management. While each country presents unique governance challenges, several common trends emerge, including the lack of stringent enforcement of mining regulations, limited disclosure of contracts and revenues, and a failure to integrate local beneficiation strategies into national economic plans. In most cases, raw minerals are extracted and exported with little to no processing, depriving African nations of the potential to build value-added industries that could generate employment and stimulate economic growth.

The report emphasizes the urgent need for reform. Strengthening regulatory frameworks and improving enforcement mechanisms would create a more stable investment climate while curbing illegal mining and illicit financial flows. Transparency measures, such as the mandatory disclosure of mining contracts and revenue reports, would ensure public accountability and reduce corruption risks. Additionally, investing in local mineral processing and battery manufacturing could allow African countries to capture greater economic benefits from their resources rather than remaining mere suppliers of raw materials. Environmental sustainability must also be prioritized, with stricter regulations to minimize land degradation, water pollution, and ecosystem destruction. Finally, regional cooperation among African nations is crucial in negotiating fairer trade agreements and reducing external dependencies that currently favor major international players like China.

If these reforms are effectively implemented, Africa's mineral wealth could serve as a catalyst for economic diversification, social development, and energy security. Rather than becoming another chapter in the long history of resource exploitation, the continent has the opportunity to establish itself as a leader in responsible and sustainable mining, ensuring that the benefits of the energy transition are shared equitably among its people. This report serves as a call to action for policymakers, industry leaders, and civil society to prioritize governance and accountability in the mining sector, ensuring that Africa's critical minerals contribute to a prosperous and sustainable future.

Introduction ▼



The transition from fossil fuels to renewable energy is a global imperative, driven by the need to mitigate climate change and achieve sustainable development. This shift necessitates a secure and responsible supply of critical minerals such as lithium, cobalt, nickel, manganese, and rare earth elements, which are fundamental to clean energy technologies like batteries, wind turbines, and solar panels. However, the extraction and management of these minerals present both opportunities and challenges, particularly for resource-rich but governance-challenged regions such as Africa.

Africa is endowed with vast reserves of critical minerals, positioning it as a key player in the global energy transition. Countries like Nigeria,

Ghana, Mozambique, and the Democratic Republic of Congo (DRC) hold substantial deposits that are essential for electric vehicle (EV) batteries, grid-scale energy storage, and renewable energy infrastructure. Despite this potential, the governance, transparency, and accountability of the mining sector remain significant concerns. Weak regulatory frameworks, corruption, illicit financial flows, and environmental degradation threaten the ability of African nations to fully benefit from their mineral wealth. Without effective policies, the continent risks replicating the resource curse, where natural resource abundance leads to economic stagnation, environmental harm, and social instability.

Governance challenges in Africa's critical mineral sector stem from a mix of historical, structural, and geopolitical factors. Many African nations have struggled with regulatory enforcement, allowing for unregulated artisanal mining, exploitative foreign investments, and revenue leakages. Additionally, global demand for critical minerals is intensifying competition, often favoring multinational corporations that exert significant influence over pricing, supply chains, and labor conditions. The dominance of countries like China in the supply of refined minerals further complicates Africa's role in the energy transition, limiting local beneficiation and value addition.

This report, produced for the Centre for Journalism Innovation and Development (CJID), Nigeria, examines the governance landscape of critical minerals in Africa, with a particular focus on Nigeria, Ghana, DRC and Mozambique. Through an analysis of policies, regulatory frameworks, and transparency initiatives, the report evaluates the effectiveness of current governance structures and identifies areas requiring urgent reform. The study employs a multidisciplinary approach, including literature reviews, policy analysis, expert interviews, and country-specific case studies.

The case studies provide a detailed examination of the transparency and accountability challenges in each country. In Nigeria, the mining sector faces persistent issues related to corruption, weak institutional oversight, and limited investment in mineral processing. Ghana's mining industry, while more structured, is heavily reliant on Chinese investments, raising concerns about revenue distribution and environmental sustainability.

Mozambique, with its growing lithium and graphite industry, must navigate the complexities of foreign direct investment while ensuring equitable benefits for local communities.

The findings highlight that without improved governance mechanisms, Africa's critical mineral wealth may become a double-edged sword, fueling economic growth for some while exacerbating inequality, corruption, and environmental degradation for others. The report offers policy recommendations to enhance transparency, strengthen regulatory institutions, and promote sustainable mining practices. These recommendations include enforcing stricter environmental standards, improving revenue tracking, and fostering regional cooperation to ensure fair trade and investment policies.

As the world accelerates its shift to renewable energy, Africa must position itself as a leader in sustainable mineral resource management. This will require a concerted effort from governments, private sector actors, civil society organizations, and international partners. By adopting best practices in governance and leveraging technological innovations in monitoring and compliance, African nations can maximize the benefits of their mineral wealth while minimizing the risks of exploitation and environmental harm.

This report serves as a call to action for policymakers, investors, and stakeholders to prioritize governance and transparency in the mining sector. A well-regulated critical mineral industry can contribute significantly to economic diversification, job creation, and energy security in Africa, ensuring that the continent's mineral wealth supports both local development and the global energy transition.

1.0 Methodology



This study employs a multidisciplinary approach to analyze the governance, transparency, and accountability challenges associated with critical minerals and the energy transition in Africa. The research methodology integrates qualitative and quantitative techniques, including literature review, policy analysis, expert interviews, and case studies.

1.1 Literature review

A comprehensive review of existing literature was conducted to provide contextual insights into the role of critical minerals in the global energy transition. This includes reports from international organizations such as the International Energy Agency (IEA), United Nations Economic Commission for Africa (UNECA), and relevant academic publications. The review explores governance frameworks, policy gaps, and best practices in mineral resource management across different African countries.

1.2 Policy and regulatory analysis

The study critically examines policy instruments and regulatory frameworks governing the mining and extraction of critical minerals in selected African countries. By analyzing legal documents, government reports, and transparency initiatives such as the Extractive Industries Transparency Initiative (EITI), the study identifies areas for improvement in institutional governance and anti-corruption measures.

1.3 Expert interviews

Key informant interviews were conducted with stakeholders from government agencies, civil society organizations, industry experts, and academic researchers. These interviews provided firsthand insights into the challenges and opportunities within the sector. The experts highlighted issues such as corruption risks, the role of political influence in resource allocation, and the need for enhanced regulatory oversight.

1.4 Case studies

The research includes country-specific case studies, focusing on Nigeria, Ghana, and Mozambique, to illustrate the governance challenges and

opportunities unique to each context. These case studies draw on historical trends, recent policy developments, and stakeholder perspectives to assess the effectiveness of existing transparency and accountability measures. Lessons from successful governance models, such as Botswana’s Minerals Revenue Transparency Unit and South Africa’s Social and Labor Plans, are also incorporated for comparative analysis.

1.5 Data collection and analysis

Primary and secondary data were synthesized to assess transparency and accountability mechanisms in the mining sector. Quantitative data sources, such as revenue reports and licensing records, were cross-referenced with qualitative insights from interviews and case studies to ensure a balanced analysis. Additionally, open data initiatives and digital monitoring tools were examined as potential solutions for improving oversight and reducing corruption risks. By combining these methodological approaches, the study offers a robust framework for understanding the governance dynamics of critical minerals in Africa and proposes evidence-based recommendations for policy enhancement.

2.0 Case studies by country – Nigeria



2.1 Introduction

The global shift from fossil fuels to renewable energy is essential for combating climate change and promoting sustainable development [1-4]. Greenhouse gas emissions have accelerated global warming, prompting nations to commit to renewable energy and set ambitious targets such as achieving net-zero emissions by 2050 to limit global temperature rise to 1.5°C above pre-industrial levels [5, 6]. Critical minerals such as lithium, cobalt, nickel, manganese, and rare earth elements are vital to this transition, forming the backbone of batteries, wind turbines, and solar panels. These technologies power electric vehicles (EVs) and grid-scale energy storage, making critical minerals indispensable to a low-carbon future [4] [7] [8].

Nigeria, rich in mineral resources, has the potential to align its resource

development with the United Nations Sustainable Development Goals (SDGs), particularly Goal 7 (Affordable and Clean Energy), Goal 8 (Decent Work and Economic Growth), and Goal 13 (Climate Action). Studies on sustainable resource use in Africa emphasize the need to integrate Nigeria's mineral and mining strategies with global sustainability frameworks [9]. While Nigeria holds significant deposits of lithium and other essential minerals for clean energy technologies, unlocking their full potential requires an inclusive approach that addresses environmental, social, and economic concerns.

However, Nigeria's mining sector faces persistent challenges, including corruption, weak regulatory enforcement, and poor transparency, which have hindered progress for decades. Additionally, inadequate infrastructure and unreliable energy supplies limit efficient mineral extraction and processing. Strengthening the critical mineral sector presents an opportunity for economic diversification and reduced dependence on oil revenues. Investment in mineral processing and value addition can stimulate industrial growth, create employment, and position Nigeria as a key player in the global clean energy supply chain. Achieving these benefits requires robust policies and effective governance. Strengthening anti-corruption measures and ensuring transparent resource management are essential for attracting investment and fostering trust. Engaging local communities in decision-making can address socio-economic concerns and enhance public support for mining projects. Additionally, enforcing stringent environmental regulations will minimize mining's ecological impact and preserve biodiversity. Investments in renewable energy and modern mining infrastructure will further support sustainable mineral extraction and processing. With improved resource management, Nigeria can drive sustainable and inclusive economic development while addressing governance, infrastructure, and environmental challenges.

Positioning Nigeria in the Global Lithium Boom

Lithium is a crucial component in lithium-ion batteries, which power electric vehicles (EVs), portable electronics, and grid storage systems. As the world transitions to renewable energy, the demand for lithium has surged. Among battery chemistries, lithium iron phosphate (LFP) is

particularly valuable for recycling due to its high concentration of essential metals. Technological advancements in battery chemistry are expected to further shape the recycling landscape in favor of lithium over the next decade. According to [10], the global EV market is projected to grow from USD 671.47 billion to USD 1,891.08 billion by 2032, with nearly 17 million EVs expected to be sold by the end of 2024. This rapid expansion positions Nigeria's lithium resources as a key player in the industry.

Meanwhile, China continues to dominate the EV market. In 2024, its EV sales surged by 40% to 11 million units, driven by extended government subsidies [10]. Chinese-made EVs are also gaining traction internationally, capturing over 80% of the Latin American market in 2024. Similar growth trends are observed in Asia-Pacific and emerging markets. In Europe, EV sales are projected to rise by 15% in 2025, building on last year's 3 million units. The United States is expected to see a 16% increase, though potential policy shifts under Donald Trump could impact long-term battery demand, with a worst-case scenario predicting a 47% decline by 2040. Africa, though lagging behind, is gradually embracing EV adoption, and Nigeria should position itself strategically to benefit from this shift.

Nigeria hosts lithium-bearing minerals such as spodumene and lepidolite within pegmatite belts across Kwara, Nasarawa, Niger, and Kogi States. These deposits, formed during the Pan-African orogenic cycle, are also rich in rare metals. While lithium exploration in Nigeria remains in its early stages, geological surveys confirm the presence of high-grade deposits. Artisanal mining has further highlighted lithium-rich ores, underscoring Nigeria's commercial potential. However, realizing this potential requires significant investments in exploration, extraction, and processing technologies [11] [2] [12].

Beyond lithium, Nigeria possesses other critical minerals essential to the global energy transition, including tin, columbite, nickel, cobalt, rare earth elements (REEs), graphite, and manganese [13] [7]. Tin and columbite, found in the Jos Plateau and parts of Nasarawa and Bauchi States, are widely used in electronics and high-temperature alloys but remain dominated by artisanal mining. Nickel and cobalt, crucial for battery production, are present in Kaduna State, particularly in Dangoma. Rare

earth elements such as neodymium and dysprosium, essential for EV motors and wind turbines, are associated with granitic formations but remain underexplored. Graphite, a key component of battery anodes, is found in Kaduna and Taraba States, while manganese, used in steel production and lithium-ion batteries, has deposits in Kebbi, Zamfara, and other northern states. These resources highlight Nigeria's potential to contribute significantly to the global supply of critical minerals provided further exploration and development efforts are pursued.

Nigeria boasts over 44 distinct mineral types, including lithium, gold, lead, tin, limestone, gypsum, coal, and uranium, spread across various states [14] [9]. Lithium-bearing pegmatite belts in Kwara, Kaduna, Niger, Nasarawa, Kogi, and many other states underscore Nigeria's potential to contribute to renewable energy technologies, such as electric vehicles [2, 15] [12]. Minerals like tin, cobalt, and rare earth elements position Nigeria as a potential key player in the global clean energy supply chain [16, 17] [7].

Despite its mineral wealth, the mining sector contributes less than 1% to Nigeria's GDP, significantly lower than South Africa's 7% or Australia's 10% [18] [12]. Mining revenue accounts for only 0.2% of total government earnings, hampered by issues such as informal mining practices and an inefficient tax collection system [19, 20]. While artisanal and small-scale mining (ASM) provides jobs for over 500,000 people, these positions are often informal and unsafe. Chile's emphasis on local beneficiation illustrates the economic benefits that Nigeria might also achieve [21].

Before the oil boom of the 1970s, mining was a major contributor to Nigeria's economy through exports of tin, coal, and columbite [22, 23]. However, the sector declined sharply due to insufficient investment, inadequate infrastructure, and weak regulation. Today, inefficient and informal ASM dominates, while large-scale mining remains sporadic due to limited geological data, insecurity, and low foreign direct investment [22]. Overlapping jurisdictions between federal and state authorities regarding mineral ownership create regulatory bottlenecks, and poor enforcement has allowed illegal mining activities to proliferate. Additionally, inadequate transport networks, unreliable power supplies, and a lack of processing

facilities further reduce the value of Nigeria's mineral exports [21].

Efforts to revitalize the mining sector have been made over the years. The Nigerian Minerals and Mining Act of 2007 introduced incentives such as tax holidays and duty-free equipment imports [24], while the 2016 Roadmap prioritized seven key minerals, formalized ASM, and promoted exploration [12, 25, 26]. The Solid Minerals Development Fund (SMDF) was established to address funding gaps for small-scale miners, though challenges with transparency and accessibility persist [25, 26]. International initiatives like the World Bank's MinDiver project aim to improve technical expertise, data collection, and sustainable practices, yet policy implementation and community engagement remain problematic.

2.2 Root causes and manifestations of corruption

Structural weaknesses enabling corruption in Nigeria's mining sector: There is a satirical connection between greenhouse gas emissions and mineral extraction. Reports indicate that a significant portion of the minerals essential for the clean energy transition is slated to be mined in countries with weak or failing resource governance. A report noted that approximately 32% of metal production for the energy sector is expected to originate from these regions (Nigeria inclusive) in the near future. This dynamic underscores the delicate balance among environmental sustainability, effective governance, and the geopolitical realities of resource extraction. In Nigeria's mining sector, corruption manifests through bribery, collusion, and illicit financial flows during licensing and operational processes. Such malpractices lead to substantial revenue losses, with audits uncovering systemic discrepancies that hinder investments in sustainable mining infrastructure. For example, [27] reported that state officials had issued mining licenses without proper due process, enabling illegal mining syndicates. Unregulated mining activities further exacerbate environmental issues, contributing to deforestation, water pollution, and soil degradation, as highlighted by [14], noting extensive environmental damage from artisanal lithium mining in Kogi State.

Outdated legal frameworks further contribute to corruption in the extractive

industries. However, while legislative measures have been introduced to combat these challenges, little successes have been recorded. The Nigerian Minerals and Mining Act (2007) and other initiatives like the Extractive Industries Transparency Initiative (EITI) aim to improve transparency and reduce corruption. However, as noted by [28], inconsistent implementation and weak oversight mechanisms continue to undermine these efforts. Additionally, attempts to decentralize decision-making in the distribution of mining revenues have fallen short, with community members largely excluded from the process. This lack of engagement results in a disconnect between community needs and resource allocation, ultimately undermining equitable and sustainable local development. Strengthening institutions, enhancing regulatory frameworks, and encouraging genuine community participation are critical steps toward addressing these issues [14].

Economic, environmental and regulatory impacts of corruption:

Corruption in Nigeria's solid minerals sector, particularly in critical minerals like lithium, undermines economic potential and leads to inefficiencies, environmental damage, and revenue loss. The World Bank estimates that corruption results in annual economic losses of \$9 billion. Weak institutions, limited transparency, and political interference exacerbate these issues, allowing corruption to persist at multiple levels. At the licensing stage, bribery and speculative hoarding distort fair practices, enabling politically connected individuals to monopolize access to lucrative mining sites [19]. During extraction, illegal mining and underreporting reduce government revenue, further weakening sectoral development [22]. Smuggling and bribery at transportation checkpoints cost the industry approximately \$50 billion annually [19, 20], while mispricing and under-invoicing in trade and exports lead to annual losses of \$3 billion [21]. Weak governance structures and poor regulatory enforcement deepen these vulnerabilities, preventing Nigeria from fully benefiting from its mineral wealth.

Regulatory loopholes allow firms to bypass environmental standards, leading to significant ecological harm. In lithium-rich regions like Nasarawa, unregulated mining has resulted in deforestation, water contamination, and land degradation. The lack of effective oversight enables companies

to exploit resources without implementing necessary environmental safeguards, further threatening local communities and ecosystems. A 2018 audit uncovered irregularities in the granting of mining licenses in lithium-rich areas, fueling conflicts and encouraging illegal mining activities [29-31]. In 2023, authorities intercepted unprocessed lithium shipments, revealing collusion between miners, intermediaries, and government officials to bypass legal export channels [31]. These incidents highlight how corruption facilitates the illicit extraction and smuggling of critical minerals, depriving Nigeria of valuable revenue and undermining its economic and strategic potential. The connection between corruption and insecurity further compounds the sector's challenges, as illegal mining operations often finance criminal groups. Ultimately, corruption in the solid minerals sector threatens Nigeria's ability to capitalize on its vast lithium reserves which is an essential resource for the global energy transition. Addressing these systemic weaknesses through stronger governance, improved regulatory enforcement, and greater transparency is critical to ensuring Nigeria's minerals contribute to sustainable economic development.

Smuggling, insecurity and the erosion of state authority: Illicit smuggling and weak governance severely undermine Nigeria's mineral and mining sector, with wide-ranging economic, social, and environmental consequences. Smuggling of minerals such as gold, lithium, and columbite-tantalite (coltan) results in significant revenue losses. An estimated 80% of gold produced in Nigeria is illegally exported, depriving the country of approximately \$2 billion annually (Nigeria Extractive Industries Transparency Initiative [19, 20, 24]). Lithium, a crucial resource for batteries and clean energy technologies, is also frequently smuggled through porous borders. Reports suggest collusion between smugglers and corrupt officials, enabling large quantities of lithium to leave Nigeria without proper taxation [32]. Beyond direct revenue losses, weak governance disrupts local industries. The unchecked importation of untaxed, smuggled mineral products such as cement and steel has adversely affected domestic manufacturers. Nigeria's cement industry, for instance, has reported significant revenue declines due to the influx of smuggled cement from neighboring countries. Smuggling also undermines Nigeria's participation in regional trade agreements, such as the African Continental Free Trade

Area (AfCFTA) and the ECOWAS Trade Liberalization Scheme. The 2019 border closure, aimed at curbing smuggling, disrupted legitimate trade and strained diplomatic relations with countries like Benin and Niger. Foreign investment in Nigeria's mining sector is also at risk. International investors remain hesitant to commit resources due to concerns over corruption, weak regulatory enforcement, and insecurity in mining regions [22].

Illicit mining contributes directly to insecurity in resource-rich regions. Smuggling networks are often linked to armed groups, including bandits and insurgents, who use proceeds from illegal mining to finance their activities. Gold smuggling in Zamfara State, for instance, has been linked to armed group financing, exacerbating conflicts and displacing thousands of residents in mining communities [31]. The proliferation of arms smuggling further fuels banditry and insurgency, destabilizing communities and discouraging legitimate investments in northern Nigeria [29]. Additionally, corruption at various levels of government allows illicit activities to thrive. Customs officials, police, and regulatory agencies routinely accept bribes, allowing smugglers to bypass enforcement measures [21]. Governance failures also affect the mining licensing process, with multiple licenses often issued for the same mining site [27].

Unregulated artisanal mining has led to severe environmental and health crises. In Zamfara State, illegal gold mining has caused widespread lead poisoning. Between 2010 and 2020, over 400 children died, and thousands more suffered severe health complications due to exposure to toxic materials during mining operations [33]. Illegal refining and oil bunkering in the Niger Delta have resulted in extensive oil spills, destroying aquatic ecosystems and agricultural land. The region has seen mangrove forests disappear, with biodiversity losses estimated at over 60% in some areas [14, 34]. In addition, regulatory loopholes allow mining companies to bypass environmental standards, leading to deforestation, water contamination, and land degradation. The Nigerian Geological Survey Agency (NGSA) has warned that illegal mining activities are eroding Nigeria's potential to leverage its vast lithium and rare earth mineral resources for the global energy transition [1, 2, 4, 12].

2.3 Assessment of transparency and accountability mechanisms

Despite Nigeria's abundant mineral resources, its mining sector remains underperforming, contributing only 0.5% to GDP [19]. Several governance frameworks have been introduced to enhance transparency and accountability, but systemic weaknesses continue to hinder their effectiveness (Table 1). These include weak enforcement, political interference, poor institutional coordination, and revenue leakages, all of which undermine the sector's potential.

Weak enforcement and institutional fragmentation: The Nigerian Minerals and Mining Act (2007) serves as the sector's primary legal framework, outlining licensing procedures, environmental standards, and community engagement mechanisms. However, its enforcement remains weak, as regulatory agencies lack the technical capacity and resources to monitor compliance, particularly in artisanal and small-scale mining (ASM), which employs over 90% of Nigeria's mining workforce [3, 35, 36]. Additionally, political interference in licensing is a major issue, with politically exposed persons (PEPs) often securing mining rights without due process [14]. The absence of strict penalties for violations has also created an environment where firms can bribe officials to evade royalty payments, leading to billions in lost revenue annually [2, 15, 35, 37]. To address these gaps, Nigeria needs an independent enforcement mechanism to hold regulatory bodies and politically connected individuals accountable.

The National Minerals and Metals Policy (2008) was introduced to promote sustainable mining practices. However, its effectiveness has been undermined by uneven adoption among stakeholders and weak institutional coordination. While the policy is in place at the federal level, state governments and private mining firms often fail to comply with its provisions [27]. Furthermore, overlapping responsibilities between the MMSD, NEITI, and the Mining Cadaster Office (MCO) create inefficiencies in enforcement. Without a centralized regulatory framework, inconsistencies in implementation persist. A stronger institutional mechanism is needed to ensure uniform adoption of the policy across all levels of governance.

The Mining Cadastre Office (MCO) has made progress in enhancing transparency through an online cadastre system that reduces discretionary license issuance [38]. However, political influence continues to shape mining rights allocations, with reports of licenses being granted based on political patronage rather than merit. Moreover, while the online cadastre system has improved access to licensing data, public oversight remains limited, preventing independent verification of approvals. To strengthen the credibility of the system, public access to licensing data should be expanded, and an independent licensing review mechanism should be established.

Gaps in oversight, audit follow-up and civil society participation:

Nigeria's commitment to the Extractive Industries Transparency Initiative (EITI) has led to improved monitoring, with NEITI audits exposing \$9 billion in lost revenue between 2010 and 2020 [19, 20, 24]. However, these audits lack enforcement power, as the government is not legally obligated to act on their findings. Despite identifying significant financial discrepancies, there are no automatic penalties for corrupt practices such as underreported royalties and opaque contracts. To address this, NEITI audit reports should be linked to legal enforcement mechanisms, ensuring sanctions for violations and mandatory follow-up investigations.

Civil society organizations (CSOs) such as Publish What You Pay (PWYP) Nigeria have played a crucial role in advocating for revenue transparency. However, their ability to hold authorities accountable is hindered by limited access to official financial disclosures and exclusion from key policymaking processes [18]. Many CSOs struggle to obtain real-time financial data, making it difficult to track how mining revenues are allocated. Strengthening the legal backing for civil society access to government mining revenue records and ensuring their active participation in policy discussions would enhance accountability in the sector.

Overall, Nigeria's mining governance frameworks suffer from weak enforcement, political interference, and a lack of institutional coordination, leading to widespread corruption and lost revenues (Table 1). To improve

governance, Nigeria must strengthen enforcement agencies, enhance licensing transparency, and ensure that NEITI audits lead to legal consequences. Also, greater community participation in revenue-sharing mechanisms and better coordination between regulatory bodies will be essential for effective sector oversight. While the mechanisms in place are commendable, their inconsistent implementation necessitates urgent reforms.

Table1: Summary of assessment of transparency and accountability mechanisms in Nigerian mining sector.

| Key Challenge | Why It Persists | Reform Needed |
|--|---|--|
| Weak enforcement of mining laws | Underfunded regulatory agencies & lack of monitoring capacity | Strengthen independent enforcement bodies with legal backing |
| Political interference in licensing | Lack of transparency in license issuance & political patronage | Establish a public oversight committee to review all mining licenses |
| Revenue leakages & illicit financial flows | Inconsistent government action on NEITI audit reports | Link audit findings to automatic legal action & penalties |
| Limited community engagement | Revenue allocation is non-transparent, and local voices are ignored | Mandate direct community participation in mining revenue allocation |
| Weak coordination between agencies | Overlapping responsibilities between MMSD, NEITI, MCO, and customs | Create a unified regulatory body for streamlined oversight |

Persistent governance and capacity challenges in reform implementation: The mining sector in Nigeria, particularly its lithium and other critical minerals, has significant potential to support economic diversification. Despite this potential, governance challenges in Nigeria’s mining sector limit its growth. Transparency and accountability frameworks are essential to address corruption, promote fair resource allocation, and support sustainable development [37]. Transparency and accountability are critical components of governance in the extractive sector, ensuring that mineral resource exploitation benefits all stakeholders, particularly host communities and the nation at large. In Nigeria, several policies and institutions have been established to address the challenges of corruption, mismanagement, and inefficiency in the mining industry. Key frameworks and initiatives include the Nigeria Extractive Industries Transparency

Initiative (NEITI), the Minerals and Mining Act (2007), the Mining Cadaster Office (MCO), and Nigeria's commitments under the Open Government Partnership (OGP).

NEITI applies global Extractive Industries Transparency Initiative (EITI) standards in Nigeria, focusing on financial, operational, and process audits of the mining sector. For example, the 2021 NEITI Solid Minerals Audit Report highlighted gaps in royalty payments and discrepancies in production data, demonstrating the need for improved enforcement measures [19, 20]. This Act forms the legal foundation for mining activities in Nigeria. It requires mining companies to establish Community Development Agreements (CDAs) with host communities to ensure local populations benefit from mining operations. However, inconsistent enforcement has led to grievances among affected communities [39].

The MCO oversees the allocation of mining titles through a digital cadastre system designed to improve transparency. Despite these measures, reports of political interference and favoritism have raised concerns about the system's credibility. Strengthening the MCO's independence and operational capacity would enhance its effectiveness. Likewise, Nigeria's participation in the OGP includes commitments to improve transparency in revenue collection and licensing within the extractive sector. While the OGP framework has increased public access to data, it has not yet led to substantial systemic reforms [11].

Anti-corruption efforts in Nigeria's minerals sector show mixed results across different institutions and programs. The Nigeria Extractive Industries Transparency Initiative (NEITI) publishes periodic reports identifying corruption and inefficiencies. The 2021 NEITI report revealed over ₦2 billion in unremitted revenues from mining companies. Despite such findings, weak enforcement often delays or prevents full recovery of these funds [19, 20, 24]. The Economic and Financial Crimes Commission (EFCC) investigates financial misconduct and illegal mining. In 2023, it apprehended individuals involved in exporting minerals worth millions of naira without proper authorization [31]. The Ministry of Mines and Steel Development (MMSD) introduced the National Integrated Mineral Exploration Project (NIMEP) to enhance transparency in resource

management. However, issues such as inadequate funding and poor coordination with other agencies limit the program's effectiveness [39].

Government agencies, including NEITI, the Mining Cadastre Office (MCO), and MMSD, play key roles in policy implementation and compliance. However, overlapping mandates and inefficiencies often lead to conflicts and delayed decision-making. For instance, weak coordination between NEITI and MCO has hindered effective data sharing. Some mining companies exploit gaps in oversight to underreport production and evade royalty payments. Audits have identified cases where companies used legal loopholes to avoid compliance, underscoring the need for stronger audits and stricter penalties [20]. Local communities, particularly in resource-rich areas, face environmental degradation and inadequate compensation. Protests in Nasarawa and Plateau states highlight the negative effects of poor consultation practices. Institutionalizing dialogue platforms and ensuring community representation in decision-making could address these grievances.

Weak institutional capacity is a major obstacle in Nigeria's mining sector. Agencies such as NEITI, MCO, and MMSD lack adequate resources and technical expertise to enforce policies. NEITI's inability to audit small-scale operations leaves significant activities unmonitored, contributing to underreporting and illegal mining. Limited funding for enforcement agencies further worsens the problem, resulting in infrequent inspections, outdated monitoring tools, and reliance on manual processes. Fragmented governance contributes to enforcement delays. Overlapping responsibilities between MMSD, MCO, and other agencies often result in jurisdictional disputes. Corruption in licensing processes and royalty collection compounds these issues. Reports suggest that some companies secure licenses through bribes or political connections, bypassing compliance requirements [19, 20, 27].

Real-time monitoring systems are lacking, making it difficult to detect underreporting and illegal exports. Current enforcement relies on retrospective audits and physical inspections, which are time-consuming and prone to manipulation. Community involvement is often inadequate. Although Community Development Agreements (CDAs) are intended to

benefit local populations, their implementation is frequently superficial. This exclusion exacerbates tensions and reduces trust in governance processes [1, 12, 36, 40]. Additionally, weak legal penalties for violations fail to deter illegal activities. For instance, fines for mining without proper licenses or causing environmental damage are often negligible compared to the profits involved.

2.4 Perceptions of experts and industry analysts on governance challenges

Governance challenges continue to hinder the development of Nigeria's mineral and mining sector. These challenges include a lack of transparency, weak oversight, corruption, and insufficient engagement with stakeholders. Experts and industry analysts agree that tackling these issues is essential to building a fair and accountable system [19, 25, 28, 41]. Transparency issues affect decision-making and resource allocation. Unreported contracts and hidden agreements fuel corruption and inequality. The non-disclosure of contracts has led to disputes over revenue sharing. A 2023 audit by NEITI revealed that some contracts lacked clear terms on royalty percentages and environmental obligations [19, 20, 24]. South Africa's public mineral contract database presents a solution. This platform provides detailed information about tax payments, environmental commitments, and social obligations, which has increased public trust in the sector. Many analysts suggest that Nigeria adopt a similar model to improve transparency.

Oversight is a crucial part of accountability, but Nigeria's regulatory agencies face resource limitations and political interference. Critics have pointed out that Nigeria's regulators struggle with limited capacity to monitor mining operations effectively. A 2021 Transparency International study found instances of unlicensed operators exploiting regulatory gaps, which led to environmental damage and revenue losses [11, 18, 37]. Botswana's Minerals Revenue Transparency Unit is an example of successful oversight. The unit's independence and adequate funding have contributed to its effectiveness in recording and allocating mining revenues transparently [1, 12, 40]. Experts recommend that Nigeria adopt similar frameworks to strengthen oversight and governance [41]. Corruption diverts resources and diminishes public trust. Bribery, embezzlement, and nepotism are common in Nigeria's extractive industries. A report by the [18-20]

estimated that unreported crude oil exports cost the government over \$2 billion annually. These losses reduce the potential for investment in public services and infrastructure. Independent audits could help address these issues.

Governance frameworks often fail to incorporate stakeholders, especially at the community level, which can lead to conflicts and unequal distribution of benefits. For example, in the Niger Delta, local communities have long protested the lack of development despite the significant oil extraction in the region. This exclusion has led to pipeline sabotage and other disruptive activities. South Africa's Social and Labor Plans (SLPs) offer a more inclusive model. Mining companies are required to engage with communities to create plans that address employment, housing, and education. These agreements ensure that affected populations benefit from resource extraction. Experts suggest that Nigeria adopt similar Community Development Agreements (CDAs). Allocating a fixed percentage of royalties to local development funds could further promote fairer resource distribution [27].

Technology has the potential to improve governance by enabling better monitoring, reporting, and resource management. However, many sectors underutilize these tools. The Democratic Republic of Congo (DRC) has shown how blockchain technology can improve governance in the cobalt industry. The system tracks cobalt from extraction to export, ensuring ethical sourcing and reducing illegal trade [8]. Similarly, in Peru, AI systems process satellite images to identify illegal gold mining in the Amazon rainforest. This has improved enforcement and reduced environmental damage. Experts suggest Nigeria adopt similar technologies. Blockchain could be used to trace mineral exports, while AI-powered systems could monitor unregulated activities in artisanal mining zones.

2.5 Recommendations

To enhance governance, reduce corruption, promote environmental sustainability, and support economic development in Nigeria's solid minerals sector, the following high-level policy recommendations are proposed (Table 2).

Table 2: A summary of proposed policy recommendations and implementation steps.

1. Strengthening governance and institutional frameworks.

| Policy Recommendation | Implementation Steps |
|--|---|
| Institutional strengthening | Strengthen the Mining Cadastre Office's operational independence, improve inter-agency coordination with the MMSD and NEITI, and enact safeguards to insulate key mining regulatory functions from political interference |
| Enhance inter-agency collaboration | Develop a centralized database for mining operations shared among relevant agencies. Foster cooperation between the Ministry of Mines and Steel Development (MMSD), Nigeria Extractive Industries Transparency Initiative (NEITI), and security agencies. |
| Improve transparency in mining licensing | <ul style="list-style-type: none"> • Implement an open-access digital cadastre system. • Mandate real-time public disclosure of license applications and approvals. |

2. Combating corruption in the solid minerals sector.

| Policy Recommendation | Implementation Steps |
|--|---|
| Strengthen anti-corruption enforcement | <ul style="list-style-type: none"> • Strengthen the capacity of the EFCC and ICPC to investigate and prosecute corruption specific to the mining sector by establishing dedicated mining corruption units, providing sector-specific training for investigators and prosecutors, and ensuring better coordination with the Ministry of Solid Minerals Development and relevant regulatory agencies. Implement whistleblower protection for reporting illegal activities. |
| Enforce penalties for illegal mining and smuggling | <ul style="list-style-type: none"> • Impose stricter fines and revocation of licenses for violators. • Deploy surveillance technology (drones, AI-powered monitoring) to track illicit activities. |
| Ensure contract and revenue transparency | <ul style="list-style-type: none"> • Adopt the Open Contracting Data Standard (OCDS) for all mining agreements. • Establish an independent audit committee to review revenue flows. |

3. Promoting environmental sustainability.

| Policy Recommendation | Implementation Steps |
|---|--|
| Enforce strict environmental regulations | <ul style="list-style-type: none"> Strengthen the enforcement of the Environmental Impact Assessment (EIA) Act. Penalize companies that fail to comply with sustainability measures. |
| Promote responsible mining practices | <ul style="list-style-type: none"> Incentivize companies adopting eco-friendly mining techniques. Introduce a Green Mining Certification for compliant firms. |
| Support land reclamation and rehabilitation | <ul style="list-style-type: none"> Establish a dedicated Environmental Restoration Fund financed by mining companies. Mandate post-mining rehabilitation as a licensing condition. |

4. Enhancing economic development and value addition.

| Policy Recommendation | Implementation Steps |
|--|---|
| Develop local lithium and critical mineral processing industries | <ul style="list-style-type: none"> Provide tax incentives for companies investing in domestic mineral processing. Establish public-private partnerships for refinery development. |
| Improve infrastructure to support mining activities | <ul style="list-style-type: none"> Invest in energy and transport infrastructure for mining regions. Develop industrial clusters for mineral beneficiation. |
| Increase revenue retention from mining activities | <ul style="list-style-type: none"> Revise royalty rates to reflect market values. Implement resource-backed investment policies similar to Chile's lithium strategy. |

Executing these recommendations will enhance Nigeria's governance structures, combat corruption, ensure environmental sustainability, and stimulate economic growth in the solid minerals sector. If implemented, the international best practices and adopting innovative regulatory measures, Nigeria will position itself as a key player in the global energy transition.

3.0 Case studies by country – Ghana



3.1 Introduction

Ghana is widely recognized for its long-standing gold production, yet its endowment extends to a range of other strategic mineral resources such as manganese, bauxite, iron ore, and, more recently, lithium [40] [42]. While these resources have the potential to support economic transformation and industrialization, their extraction and management are increasingly marred by governance deficits, limited transparency, and allegations of corruption—factors that have historically plagued Ghana’s broader extractive sector [40][51]. The country’s extractive governance challenges are mirrored in its critical mineral value chains, which remain underdeveloped and heavily dependent on foreign capital and influence [54][55]. For example, despite the discovery of lithium deposits estimated to be worth USD 150 billion, concerns have already emerged about opaque licensing procedures and the discretionary role of political elites in awarding concessions [44]. The recent interest of the Minerals Income Investment Fund (MIIF) in partnering with Atlantic Lithium to exploit lithium in Ewoyaa has raised questions about the integrity and transparency of Ghana’s resource allocation systems [44][43].

This pattern is not isolated to lithium. In the manganese sector—one of Ghana’s most mature mineral industries—foreign dominance, particularly by Chinese entities, has come under scrutiny [45][46][51]. China, through its operation of the Ghana Manganese Company, has secured an overwhelming share of Ghana’s manganese exports, accounting for 96.6% of shipments in 2022 [47]. While this relationship has yielded export revenues, it has also raised concerns about market overreliance, the absence of value addition, and the limited regulatory influence of Ghanaian institutions in the face of foreign corporate control [40][54]. At the heart of these issues lies the fragile governance framework underpinning Ghana’s mineral sector. Although policies such as the Minerals and Mining (Amendment) Act, 2019 aim to improve transparency and regulate the licensing process, enforcement remains weak [40]. Regulatory authorities such as the Ministry of Lands and Natural Resources and the Minerals Commission

are often criticized for failing to uphold accountability, thereby enabling corruption and rent-seeking behaviors [41][51][52]. This has translated into poor environmental stewardship, revenue leakages, and minimal community benefits [54][55].

As the global demand for clean energy minerals accelerates, Ghana's strategic position in the manganese supply chain is becoming increasingly important [45][50]. Manganese, a key component of lithium-ion batteries used in electric vehicles (EVs), places Ghana in a potentially advantageous position within the global energy transition [48][49]. Projections indicate that the EV market could exceed USD 1.8 trillion by 2032, increasing pressure on countries like Ghana to meet demand while ensuring responsible resource governance [48][50]. But Ghana's historical experience with extractive industries shows that natural resource wealth does not automatically lead to inclusive development [40][53]. Without robust institutional safeguards, increased demand could exacerbate governance failures and deepen existing patterns of elite capture and corruption [40][53]. As the country positions itself to supply critical minerals for global decarbonization, the urgent need to embed integrity, enforce transparency, and curtail political interference in mining operations becomes paramount [41][52][56].

In summary, Ghana's emerging role in the critical minerals market—particularly in manganese and lithium—offers both opportunities and risks [45][44]. If past lessons are ignored, these resources may follow the path of previous extractive booms that enriched the few at the expense of many [40][51][53]. To avoid repeating history, Ghana must confront entrenched governance failures and corruption vulnerabilities that threaten to derail the promise of its mineral wealth in the clean energy era [40][41][52][57].

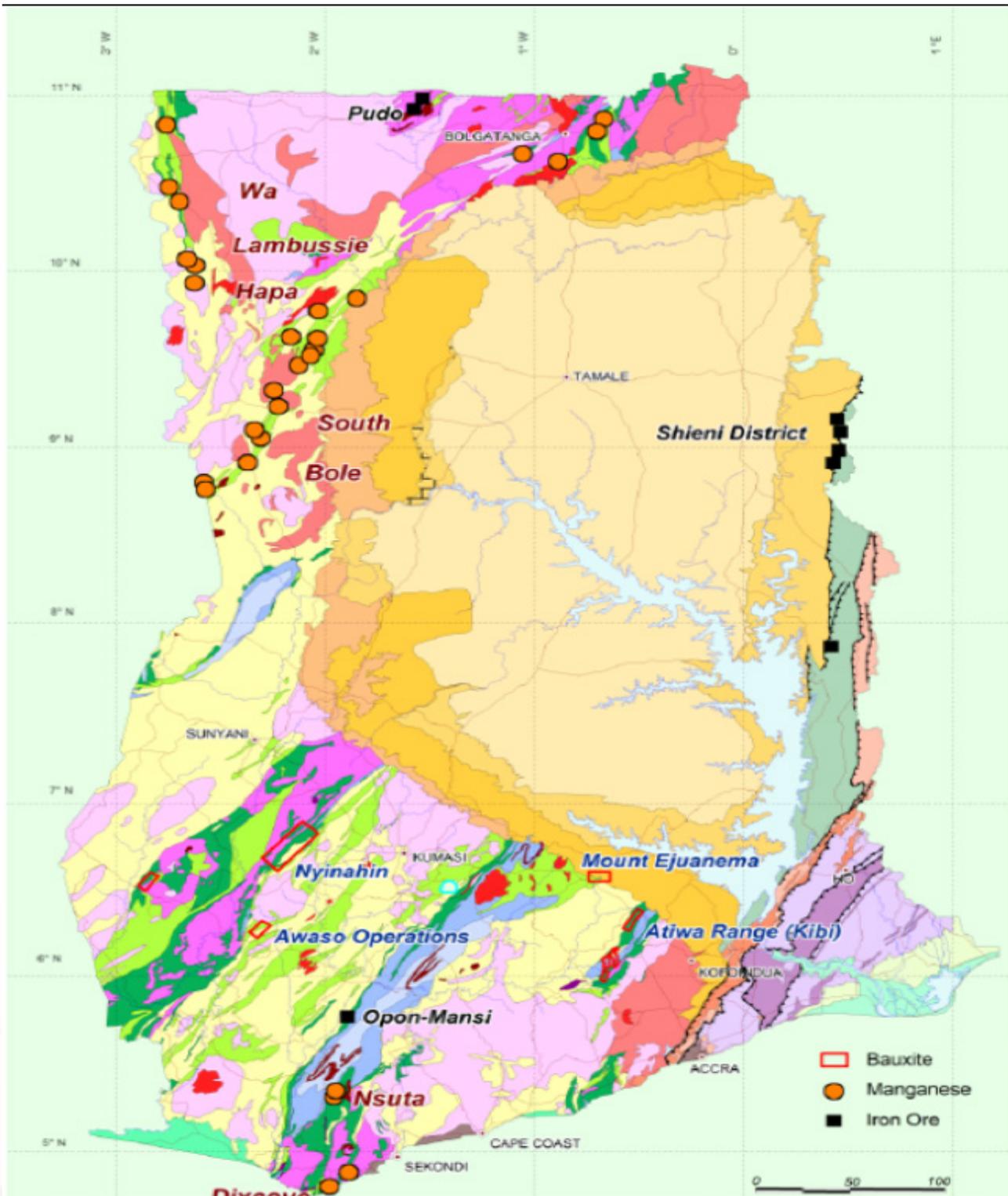


Figure 1: Ghana's mineral deposit (Source: Mineral Commission Ghana).

3.2 Root causes and manifestations of corruption

Corruption in Ghana's mining sector manifests in various ways, particularly through the licensing regime. Expert 1 (Civil Society Organization/CSO representative) emphasized that licenses are often granted to party members, friends, and associates, rather than those who have applied through the normal process. He explained, "Usually, the procedure is overturned by government officials. They end up giving the license to party members, friends, acquaintances, and not people who have applied through the normal process. This is a common feature I'm aware of. Hence, there's no transparency in the licensing aspect. This lack of transparency undermines the integrity of the sector and deprives the state of potential revenue.

Another manifestation of corruption is the destruction of water bodies and forest resources by miners who bribe regulatory bodies to turn a blind eye. Expert 2 (government representative) highlighted, "Destruction of water bodies and forest resources occurs by miners who pay money to regulatory bodies. Instead of regulating them, these bodies choose to look the other way. This is a clear manifestation of corruption in your sector". This not only harms the environment but also deprives local communities of vital resources.

Experts noted that corruption primarily occurs during the licensing and export stages of mining. He reiterated that licenses are often given to politically connected individuals or family members of ministers or presidents, leading to a lack of transparency and significant financial losses for the country (Figure 2). He explained, "People who are politically connected are given licenses. People who are family members of the minister or the president may get licenses. People who are connected through family and friends also end up getting licensed. There's no prosperity in that sector, and the country ends up being shocked. The amount of money that could have come back into the country as revenue from gold is reduced. So that's what happens" The diversion of revenue further exacerbates the negative impact of corruption on the state.

Political influence and institutional weaknesses in licensing: [Watari et. al.,

(2021); 50], reported that a substantial portion of mineral extraction, which is crucial for supporting the energy transition, is projected to occur in countries characterized by weak, poor, or failing resource governance. Their study indicates that over the examined scenario period, approximately 32% of resource extraction related to metal production for the electricity sector is expected to take place in nations with inadequate governance structures. This finding highlights the complex interaction between environmental sustainability goals, governance, and the geopolitical realities of resource extraction.

One of the most evident causes of corruption in the extractive sector is an outdated anti-corruption legal framework. Ghana's legislative system has fallen behind, creating gaps in addressing new types of corruption. This legislative inadequacy is particularly pronounced in dealing with transnational corruption and bribery of foreign officials, which are prevalent in the internationally connected mineral sector. Such bribery and corruption have permeated national political actors, from high-level appointments in regulatory and technocratic positions to local actors such as chiefs.



Figure 2: Bribery in the mineral sector (Source: <https://theheraldghana.com/minerals-commission-others-caught-up-in-dirty-bribery-controversy/>).

Ghana operates under an executive presidency, which empowers the president to appoint key individuals in every state institution. Unfortunately, many of these appointments are often marred by cronyism and political patronage. Furthermore, the president's authority to appoint

one-third of district assembly members nurtures patronage networks that can influence local decision-making across all sectors, including mining. The discretionary powers established within the mineral acts provide avenues for the Minister in Charge to exercise authority over granting and terminating license agreements. When individuals are appointed based on political connections rather than expertise and integrity, it undermines the effectiveness of regulatory bodies and opens the door to corrupt practices. The ripple effects of this political interference extend throughout the sector, influencing decision-making processes and compromising the impartiality of oversight mechanisms. This politicization is particularly evident in the licensing process for mineral extraction (Figure 3). Moreover, Ghana's mining sector still relies heavily on direct negotiations for awarding licenses. This approach significantly increases the risk of corruption due to its lack of transparency and creates opportunities for undue influence.

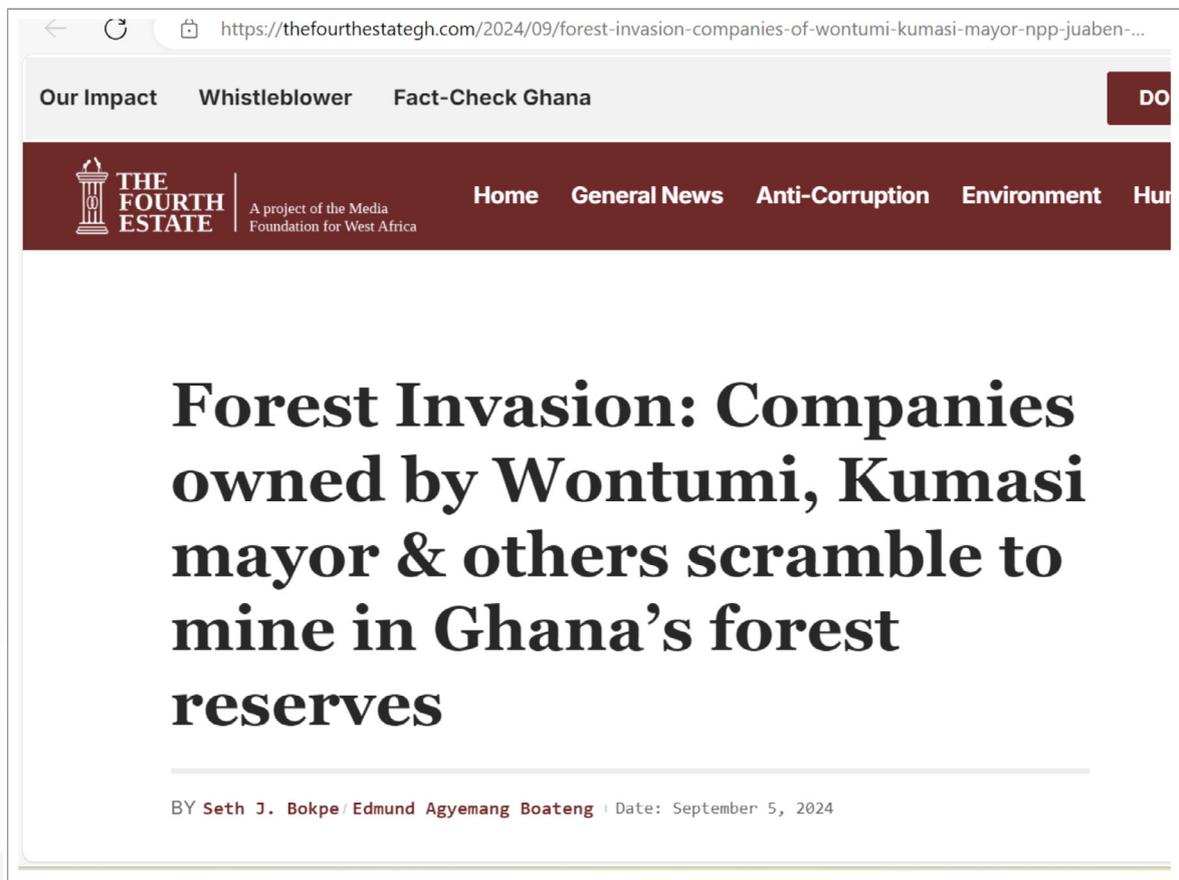


Figure 3: Political patronage regarding mineral licensing in Ghana (Source: <https://thefourthstategh.com/2024/09/forest-invasion-companies-of-wontumi-kumasi-mayor-npp-juaben-parliamentary-candidate-others-scramble-for-mining-in-ghanas-forest-reserves/>).

A critical issue in the mining sector is the lack of transparency surrounding mineral revenue allocation. The disproportionate focus on elite-centric

decision-making processes, rather than inclusive community participation, encourages an environment conducive to corruption. Local authorities and influential individuals frequently misappropriate mining revenues for personal gain instead of community development. For instance, some traditional leaders rationalize lavish expenditures by interpreting their mandate to maintain their position's status [40]. This misallocation of funds not only deprives communities of vital resources but also erodes trust in traditional leadership structures. Moreover, alleged collusion between traditional leaders and mining companies exacerbates the problem. There have been reports of certain politically exposed persons and Chiefs who compromise community interests by sanctioning environmentally harmful practices in exchange for personal benefits [40]. Such behavior undermines the role of traditional authorities as community stewards and diminishes the potential positive impact of mining on local development.

Corruption within local government compounds these challenges. District assemblies face accusations of financial mismanagement, contract irregularities, and unauthorized disbursements. Audits have uncovered numerous financial discrepancies, revealing systemic governance issues that extend beyond the mining sector [51]. The limited community involvement in decision-making processes regarding mining revenues is another significant concern. Despite decentralization efforts, there is minimal genuine community engagement in the management and distribution of mining-derived wealth. Most elected representatives seldom consult their constituents, resulting in a misalignment between community needs and resource allocation [52]. This disconnect undermines the potential for equitable and sustainable local development in mining-affected areas.

Another issue is the poor tax regime in the mining sector. Whereas Ghana established the Public Interest and Accountability Committee (PIAC) as an independent oversight body to ensure accountability in the management and use of Ghana's petroleum revenues, the same has not been done for the manganese, gold and other minerals. This lacuna has created avenues for tax evasion by players in the mineral sector and misapplication of revenue generated (Figure 4). The Ghana Manganese Company has been shut down for tax fraud and other revenue under-reporting.

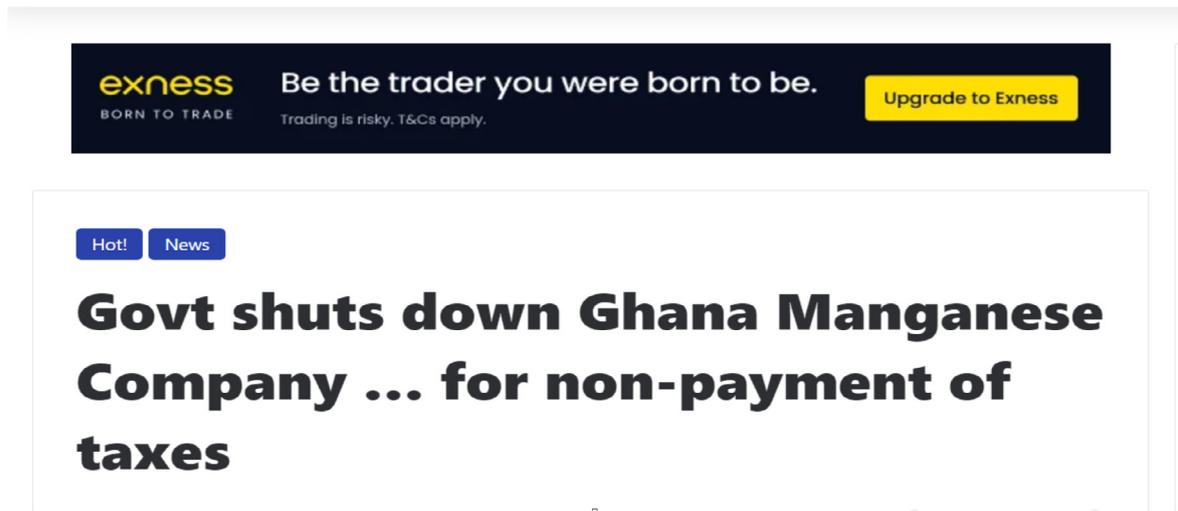


Figure 4: Regulatory and tax challenges in Ghana's mineral and mining sector (Source: <https://ghanaiantimes.com.gh/govt-shuts-down-ghana-manganese-company-for-non-payment-of-taxes/>)

Revenue mismanagement and local-level corruption: The minerals sector in Ghana plays a key role in the nation's economy, serving as a significant contributor to government revenues, foreign exchange earnings, and employment opportunities. Predominantly, gold mining has established Ghana as Africa's leading producer, drawing substantial foreign investment while stimulating ancillary industries, such as transportation and logistics. However, the landscape of governance within this sector has faced considerable challenges, including regulatory mismanagement and corruption, which often undermine the sustainability of its benefits. Poor governance has resulted in socio-economic disparities and environmental degradation, exacerbating the plight of local communities who depend on these resources for their livelihoods. The pressing need for improved governance is underscored by the belief that when managed effectively, mineral wealth can be a vehicle for national development, addressing both poverty and inequality [53]. Moreover, studies on sustainability practices indicate that better adherence to environmental regulations and stakeholder engagement can lead to more equitable impacts of mining activities [54, 55].

The financial impacts of governance failures in Ghana's minerals sector

are profound and multifaceted and significantly hinder economic development. A lack of effective regulation and oversight has led to rampant mismanagement of resources, undermining potential benefits for local communities and the national economy. As evidenced during the implementation of the World Bank and IMF-led Structural Adjustments Program, the anticipated improvements in development have not materialized, resulting instead in persistent conflicts between mining companies and local communities, often rooted in issues like environmental degradation and unfulfilled compensation promises [52]. Furthermore, misallocation of resource wealth can exacerbate social inequalities and perpetuate poverty. Thus, while resource wealth presents opportunities for economic advancement, the mismanagement of these resources leads to lasting financial detriments hence the urgent need for effective governance and sustainable practices in the sector [52].

Mismanagement and corruption in Ghana's minerals sector affect economic stability and social welfare beyond financial losses. Inadequate enforcement of regulatory frameworks, such as those outlined in the Petroleum Revenue Management Act, highlights systemic vulnerabilities. For instance, non-compliance with auditing and reporting requirements not only facilitates the misappropriation of funds but also undermines accountability measures essential for governance [56]. This environment leads to negative outcomes, like patronage networks and increased resource inequality [57]. Ultimately, these governance failures manifest in both diminished public trust and a compromised ability to leverage mineral revenues for sustainable development, thereby entrenching the very cycle of poverty and underdevelopment that such resources were meant to alleviate.

Governance failures in the minerals sector of Ghana have profound social implications, often exacerbating existing inequalities and fostering discontent within affected communities. The absence of effective regulation and oversight can lead to disputes between mining companies and local communities regarding environmental impact and land use compensation. These conflicts may affect community cohesion and contribute to ongoing social and economic challenges. As indicated [52], the conflicts resulting

from unfulfilled promises by mining firms highlight the state's inability to mediate effectively between corporate interests and community rights. Additionally, the mismanagement of resource wealth contributes to acute social inequality and deepened poverty, underscoring the critical need for improved governance frameworks. Efforts to harness extractive industries for sustainable development must prioritize equitable benefits to communities to mitigate these adverse social effects.

The nexus between poor governance in mining operations and community displacement is a critical issue in Ghana, wherein ineffective regulatory frameworks precipitate significant social unrest. As mining activities expand, local populations often find themselves forcibly removed from their ancestral lands, exacerbating tensions and leading to conflicts over resource ownership and environmental degradation. The role of institutional inadequacies cannot be understated, as they frequently result in lackluster enforcement of land rights and insufficient compensation mechanisms. Furthermore, instances of social dislocation exemplify broader challenges related to governance, including stakeholder representation and accountability, which are vital for managing community resources effectively and sustainably [58]. The violence linked to these displacements underscores the need for governance reforms to address social unrest and strengthen community resilience [58].

Ghana's minerals sector governance failures have significant financial and social impacts beyond economic loss. The political and ecological challenges surrounding initiatives such as the Bauxite Sinohydro deal exemplify the complexities involved in balancing economic progression with environmental protection, where the promise of industrialization often conflicts with the preservation of critical biodiversity, particularly in regions like the Atewa Forest [59]. Moreover, unregulated small-scale mining has raised security concerns and affected community stability, highlighting governance challenges that can lead to larger societal issues and unsustainable practices [59]. As Ghana navigates these challenges, it is imperative to create a governance framework that not only fosters economic growth but also prioritizes environmental stewardship and social equity, ensuring that future development does not come at the

expense of the very resources that sustain the nation.

Economic, social and environmental consequences of governance failures: Interviews with key industry experts have identified two primary internal drivers of corruption in the mining sector: the substantial demand for mining licenses and the fluctuation in mineral prices. Expert 1 elucidated: “Several internal factors contribute to this issue. The significant demand for mining has precipitated a surge in license applications, promoting an environment conducive to corruption. Moreover, the pricing dynamics of these minerals play a crucial role. For example, when gold prices exceed \$1,005 per ounce, it triggers a rush to acquire mining licenses. There exists a distinct correlation between mineral prices and the prevalence of corruption.” This increased demand creates conditions favorable for corrupt practices, as both individuals and corporations may resort to offering bribes to secure coveted licenses.

The experts further provided invaluable insights into the historical context and cultural factors contributing to corruption in the mining sector. Before 1983, the state held most mining licenses. The subsequent liberalization of the sector necessitated direct engagement between individuals and ministry officials for license acquisition. This shift, as Expert 1 explained, created fertile ground for corruption: “That then became the point where the seed of corruption was planted, because anyone in the country who needed a license, as well as those in a few key positions, was likely to be corrupted.” Furthermore, expert 1 elucidated how deeply ingrained cultural and societal norms perpetuate corrupt practices. There exists an expectation of payment at every level of the licensing process, reflecting a pervasive culture of bribery. He stated: “When you apply for a license, from the start of the process to the highest level, everybody expects you to pay. Everyone anticipates receiving some form of payment.” Notably, he highlighted that even elderly members of society frequently perceive these payments as customary, advising others to proceed with such practices. He explained: “If you talk to the elderly, they consider it normal. In our custom, we show gratitude to people, so they advise us to go ahead and pay. It’s also a certain kind of mindset that corruption is acceptable, okay?” This cultural acceptance normalizes corrupt practices, making them

particularly challenging to address.

The global demand for green minerals exacerbates the risk of corruption. Expert 2 explained, “Yes, as I mentioned earlier, the high demand for green minerals has triggered a mad rush for mining licenses. This rush creates fertile ground for corruption. Questions inevitably arise, such as who should be granted the licenses? Who should receive the concessions? Who should be consulted in the decision-making process? In many cases, the people making these decisions are not guided by the principles of transparency and equity.” The increased competition for access to mineral resources presents opportunities for corrupt practices in the allocation of concessions. Political influence also plays a significant role, as licenses are often awarded to well-connected individuals rather than through a fair and competitive process.

3.3 Assessment of transparency and accountability mechanisms

Role of transparency initiatives and civil society: Ghana has implemented several transparency and accountability initiatives in its mining sector; most key is the Extractive Industries Transparency Initiative (EITI). Expert 1 highlighted Ghana’s participation in the EITI since 2003, explaining its mechanism:

“The EITI has been a part of Ghana’s mining governance since 2003. Annually, a government-appointed aggregator examines the revenue generated from mineral resources and communicates with mining companies to determine their payments to the government. This process allows for a comparison to identify any discrepancies. If discrepancies are found, an investigation into their source is initiated.” The EITI’s primary objective is to ensure transparency by cross-referencing government revenue with company payments and thoroughly investigating any inconsistencies. However, he pointed out a significant limitation: the EITI’s scope does not extend to the informal mining sector, particularly illegal mining operations. This gap in coverage presents a challenge to achieving comprehensive transparency in Ghana’s mining industry.

Civil society organizations (CSOs) play a pivotal role in promoting transparency within the mining sector. Expert 1 emphasized the critical functions of CSOs in exposing corruption and elevating public awareness: “The primary objective is to uncover acts of corruption within the sector. We must illuminate these instances of malfeasance. As we bring these transactions to light, public awareness increases correspondingly. Furthermore, we must prioritize public sensitization. Heightened public awareness directly correlates with reduced corruption. The public must comprehend the significance of mineral resources and recognize that these assets belong to the populace. The president serves merely as a trustee, and it is incumbent upon us to actively participate in ensuring transparency.” By exposing corrupt transactions, CSOs contribute significantly to holding those in positions of power accountable. The statement again underscores the importance of public awareness and engagement in safeguarding transparency in the management of mineral resources. This approach not only fosters a more informed citizenry but also strengthens the democratic oversight of natural resource governance.

Corporate disclosure, contract transparency and legal gaps: Industry-led initiatives play a crucial role in enhancing transparency within the mining sector. Expert 2 emphasized the significance of voluntary financial disclosure by companies as a key contributor to these transparency efforts. He cited Newmont as an exemplary case, highlighting the company's proactive approach in disclosing its income tax and royalty payments. He provided a nuanced observation on the current state of affairs: “Despite marked improvements in transparency within the mining sector, accountability remains a persistent challenge. Regrettably, legal infractions often go unchecked, which undermines the efficacy of established transparency measures. This statement highlights the relationship between transparency and accountability in the mining industry. It notes the importance of advancing transparency efforts while also emphasizing the need for strong enforcement mechanisms to achieve effective accountability. The apparent disconnect between enhanced transparency and inadequate accountability underscores a critical area that demands focused attention and comprehensive reform in mining sector governance. This situation highlights the need for a holistic approach to industry oversight, where transparency initiatives are complemented by stringent accountability measures. Such an integrated strategy would not only foster trust among stakeholders but also contribute to the long-term

sustainability and ethical operation of the mining sector.

Access to information concerning mining contracts and revenues is paramount for ensuring transparency in the extractive sector. Expert 1 highlighted the issue of inadequate contract disclosure for local companies compared to most international entities and multinational corporations: “International entities and multinational corporations, particularly those originating from the United States, are mandated to make their contracts publicly available online. This provision enables Ghanaian citizens to access the contractual agreements of certain multinational entities. However, contracts about local companies and some multinationals remain obscured from public scrutiny. For instance, ascertaining the contractual status of companies originating from South Africa presents a significant challenge. In contrast, American and Canadian companies listed on the New York Stock Exchange are obligated to publish their contracts, which can be independently verified through the stock exchange. Furthermore, these contracts are subject to parliamentary ratification.” His statement underscores the inconsistent availability of contract information across various types of mining companies operating within Ghana. While some multinational corporations, particularly those listed on major international stock exchanges, are subject to stringent disclosure requirements, local companies and multinationals from certain jurisdictions are not held to equivalent standards of transparency. This disparity in information accessibility poses a substantial challenge to comprehensive sector oversight. Expert 1 emphasized that enhanced access to information is crucial for accountability and mitigating corruption within the mining industry. This observation accentuates the necessity for more uniform and inclusive transparency measures that incorporate all entities operating within Ghana’s mining sector, irrespective of their origin or scale of operations. The implementation of such comprehensive transparency initiatives would not only level the playing field for all industry participants but also significantly contribute to improved governance, increased public trust, and sustainable development of Ghana’s mineral resources.

Expert 1 highlighted two significant instances of successful anti-corruption interventions in Ghana’s mining sector: the Agyapa deal and the lithium deal.

Box 1: Successful Anti-Corruption Interventions in Ghana’s Mining Sector: The Agyapa Deal and Lithium Agreements.

Ghana's mining sector has been a focal point for both economic development and governance challenges, particularly concerning transparency and corruption risks. Two significant anti-corruption interventions—the halting of the Agyapa Royalties Deal [60] and the increased scrutiny over lithium agreements [61] demonstrates the impact of civil society advocacy, media pressure, and institutional oversight in promoting accountability.

1. The Agyapa Royalties Deal

The Agyapa deal was a proposed gold royalty monetization agreement that sought to create a special-purpose vehicle (Agyapa Royalties Ltd.) to leverage Ghana's future gold royalties on the London Stock Exchange. However, concerns over transparency, potential conflicts of interest, and the risk of undervaluing Ghana's mineral wealth led to widespread opposition. Key actors in halting the deal included:

- **The Office of the Special Prosecutor (OSP):** The first Special Prosecutor, Martin Amidu, conducted a corruption risk assessment, highlighting irregularities and a lack of transparency in the agreement.
- **Civil Society Organizations (CSOs):** Groups like the Africa Centre for Energy Policy (ACEP) and IMANI Africa strongly criticized the deal, arguing that it was structured in a way that could lead to revenue losses.
- **Media & Public Pressure:** Extensive media coverage and public debates kept the issue in the spotlight, compelling the government to reconsider.
- **Parliamentary and Political Opposition:** Some legislators raised concerns about the opaque nature of the agreement and its long-term implications for Ghana's resource governance.

Following these interventions, the then President Nana Akufo-Addo eventually directed a review of the deal, leading to its suspension. This case highlighted the effectiveness of institutional checks and public

accountability in preventing potentially exploitative resource deals.

2. Scrutiny of Lithium Agreements

Ghana's emerging lithium industry has also seen anti-corruption efforts aimed at ensuring fair resource governance. In 2023, the government signed an agreement with Barari DV Ghana Ltd, a subsidiary of Atlantic Lithium, granting them a stake in the country's lithium reserves. However, concerns arose over:

- **Revenue Sharing and State Participation:** Critics argued that Ghana should secure better terms, ensuring a more substantial state share in the lithium value chain.
- **Transparency and Public Engagement:** Calls for greater disclosure of contract terms pushed the government to provide more clarity on revenue expectations.
- **Lessons from Past Resource Deals:** Learning from the Agyapa case, CSOs and policymakers demanded stronger safeguards to prevent unfair contractual obligations.
- **As a result, the government revised aspects of the lithium deal to ensure a higher stake for Ghana, aligning it with broader efforts to maximize resource benefits and avoid the pitfalls of previous agreements in the extractives sector.**

Key Takeaways

- Institutional oversight, media pressure, and CSO advocacy play a critical role in exposing corruption risks and ensuring fair resource governance.
- The Agyapa case illustrates how public scrutiny can prevent exploitative deals, while the lithium interventions show a shift towards more cautious and beneficial agreements.
- These cases highlight the importance of contract transparency, stakeholder engagement, and proactive governance in Ghana's extractive sector.

Barriers to reform and opportunities for innovation: In both cases, intense public scrutiny and comprehensive discussions led to markedly improved outcomes. He attributed the success of these interventions to two critical factors: unfettered access to information and proactive public engagement. However, he identified a formidable obstacle to the implementation of effective anti-corruption measures: the prevailing political landscape. He also offered a pointed observation on this matter: "The government always has something to hide." This succinct statement encapsulates expert 1's perspective on the pervasive lack of political will that frequently impedes efforts to combat corruption and promote transparency in the mining sector. It implies that governmental entities may be hesitant to fully embrace transparency initiatives due to entrenched interests or apprehensions about potential political ramifications. His analysis illuminated the intricate interplay between public oversight, governmental transparency, and political motivations within the context of anti-corruption efforts. It underscores the persistent challenge of aligning political interests with the broader objective of ensuring transparency and accountability in the management of national resources. The insights provided underscore the complexity of addressing corruption in the mining sector and highlight the need for a multifaceted approach that encompasses legal, institutional, and cultural changes to foster a more transparent and accountable governance framework.

The experts acknowledged a lack of familiarity with specific anti-corruption strategies from other regions that could be directly applicable to Ghana's mining sector. However, the experts suggested that valuable insights could be derived from examining the experiences of other African nations. Drawing from observed practices elsewhere, proposes a potential solution: "I am aware that some countries have established comprehensive information repositories. These typically take the form of secure websites where authorized users can access extensive data. It would be tremendously advantageous if a similar platform were available to review contracts between mining companies and nations." This statement showed advocacy for the creation of a centralized, digital repository that would make all mining-related information readily accessible to relevant stakeholders. Such a platform would significantly enhance transparency

and facilitate more effective oversight of the mining sector. His proposal highlights the potential benefits of leveraging technology to promote transparency and combat corruption. A centralized information repository could serve multiple purposes: enhancing access to critical information about mining operations and agreements; facilitating independent analysis and scrutiny of mining contracts and activities; promoting accountability by streamlining the tracking of compliance with regulatory requirements and contractual obligations; and fostering a more informed discourse on mining-related issues. This suggestion aligns with global best practices in open governance and demonstrates a forward-thinking approach to addressing transparency challenges in Ghana's mining sector. The implementation of such a system could mark a significant milestone in the pursuit of more effective anti-corruption efforts and improved governance within the industry.

By adopting this innovative approach, Ghana could potentially establish a new benchmark for transparency in the African mining sector, fostering greater public trust and attracting responsible investment in its mineral resources. Such an initiative would not only benefit Ghana but could also serve as a model for other resource-rich nations seeking to enhance transparency and accountability in their extractive industries.

3.4 The role of stakeholders in combating corruption in the mining sector

Addressing corruption in the mining sector requires the concerted efforts of diverse stakeholders. The experts emphasized the imperative for government action, specifically the revitalization of anti-corruption legislation and the demonstration of unwavering commitment to combating corrupt practices. Expert 1 articulated:

“The government must overhaul the anti-corruption bill. It must exhibit a strong resolve to eradicate corruption within the sector.” This statement underscores the critical need for robust legislative frameworks and rigorous enforcement mechanisms to effectively deter and penalize corrupt activities. Multinational corporations and other industry players also bear significant responsibility in this endeavor. He notes that many of

these entities are participants in the EITI and have committed to upholding anti-corruption standards. He elaborated further: “Companies, particularly large multinational corporations, shoulder considerable responsibility. The majority are EITI participants and have subscribed to anti-corruption standards. We anticipate their strict adherence to these self-imposed commitments. Their operations must epitomize transparency, with a willingness to disseminate pertinent information to the public.” This observation notes that companies are expected to adhere to ethical standards, operate transparently, and disclose relevant information to the public. By consistently upholding these practices, companies can make substantial contributions to fostering a more transparent and accountable mining sector.

The above comments underscore the necessity for a synergistic approach involving both governmental and industry stakeholders to effectively combat corruption and enhance transparency in Ghana’s mining sector. This multi-faceted strategy, encompassing legislative reform, governmental commitment, and corporate accountability, presents a comprehensive framework for addressing the complex challenges of corruption within the industry. Implementation of such a holistic approach could significantly improve governance, bolster investor confidence, and ensure the equitable distribution of benefits from Ghana’s mineral resources.

Local communities also play a pivotal role in combating corruption within the mining sector. The experts emphasized the critical importance of community engagement and vigilance, proposing that residents of mining areas should function as informed watchdogs. Expert 2 articulated: “Local communities can make a substantial contribution by reporting observed illegal activities. These communities should essentially serve as vigilant observers, possessing comprehensive knowledge about the companies operating in their vicinity.” This statement underscores the indispensable role of community involvement in deterring corrupt practices and ensuring that mining operations yield tangible benefits for local populations. By fostering active participation and facilitating information dissemination, communities can become empowered stakeholders in the governance of mineral resources. This perspective also illuminates several key aspects of

effective community engagement. Communities should be well-informed about the mining companies operating in their area, including their rights, obligations, and the potential impacts of mining activities. Residents should maintain constant vigilance over mining operations, remaining alert to any activities that may appear irregular or illegal. Effective channels should be established for communities to report suspected illegal activities or violations of mining regulations. Moreover, communities should be equipped with the requisite knowledge and resources to act as effective watchdogs and advocates for their interests. This community-centric approach to combating corruption aligns with best practices in participatory governance and corporate social responsibility.

The media and journalists play a pivotal role in combating corruption within the mining sector. Expert 2 expressed concern about the scarcity of specialized journalists capable of reporting on corruption in this industry, articulating: “A significant challenge is the dearth of journalists specialized in reporting corruption activities. We require more journalists who can act as crusaders within the sector. They should collaborate with multinational companies and ensure that regulations and policies are properly implemented. Their capacities and reporting tools must be upgraded. Furthermore, these journalists should extend their coverage to remote areas.” This statement underscores the critical need for a cadre of skilled journalists dedicated to investigating and reporting on corruption in the mining industry. Expert 2’s perspective highlights several key aspects of effective journalistic engagement in anti-corruption efforts. Moreover, specialization is paramount, with a pressing need for journalists possessing in-depth knowledge of the mining sector and expertise in uncovering corrupt practices. Collaboration with multinational companies is essential for gaining insights and access to information while maintaining journalistic independence and objectivity. The media should fulfill a watchdog role, ensuring proper implementation and enforcement of mining regulations and policies. Also, capacity building is crucial, with journalists requiring ongoing training and access to advanced reporting tools to effectively investigate and report on complex corruption cases.

Comprehensive coverage is necessary, extending reporting beyond urban centers to include remote mining areas, thus ensuring thorough sector oversight.

By exposing corrupt practices and holding those in power accountable, the media can play a pivotal role in promoting transparency and good governance in Ghana's mining sector. This approach aligns with global best practices in investigative journalism and anti-corruption efforts. The call for "crusading" journalists emphasizes the need for a proactive and fearless media that can navigate the complexities of the mining industry while maintaining the highest standards of journalistic integrity. Such a robust media presence can serve as a powerful deterrent to corruption and a catalyst for positive change in the governance of Ghana's mineral resources.

3.5 Recap of expert perspectives on governance and transparency in the mining sector

The Ghana case study presented in this report draws extensively on expert interviews that provided valuable insights into the persistent governance and transparency challenges facing the country's mining sector. These interviews underscored not only the systemic weaknesses in the current regulatory and institutional framework but also the practical pathways through which civic technology, open data and participatory mechanisms could be leveraged to drive accountability and reform. What follows is a synthesis of these expert perspectives, intended to reinforce the strategic direction already articulated in the main analysis.

One of the most prominent themes that emerged from the interviews was the urgent need to rethink how data on mining activities is made available to the public. Experts consistently pointed out that while Ghana has made some strides in publishing mining-related data, the usability and accessibility of this information remain limited. Civic technology tools and open data platforms were viewed as promising, but only if they are intentionally designed to serve a broad audience, ranging from policymakers and regulatory bodies to local communities, researchers, journalists and international observers. Experts highlighted that the mere

availability of datasets is insufficient in the absence of interpretability. To bridge this gap, they advocated for the integration of interactive data visualizations that can simplify complex information on licensing, revenue flows, and environmental impact assessments into formats that are intuitive and comprehensible for non-technical users.

Additionally, a strong emphasis was placed on strengthening community-level participation in the governance of the mining sector. Many interviewees described how mining-affected communities often remain on the margins of decision-making processes, despite bearing the brunt of the environmental and social costs of mineral extraction. Experts stressed that one of the most effective ways to foster local accountability is by deploying mobile-based digital tools, such as simple applications or SMS platforms, that allow community members to report illegal mining operations, environmental infractions, or corruption at the site level. These technologies, they noted, would be especially valuable in areas with limited internet connectivity. However, for such initiatives to be effective, they must be complemented by targeted investments in digital literacy and capacity building. Community members must be equipped with the skills and knowledge required to use these tools confidently and consistently, particularly in rural and underserved regions.

Another key issue raised during the interviews was the glaring gap in media capacity to cover the extractive sector in a sustained and informed manner. While Ghana has a vibrant press, experts noted that investigative journalism specific to mining governance is still underdeveloped. In response, they proposed the establishment of a dedicated support infrastructure for journalists working on extractives. This could take the form of an integrated digital platform that provides access to specialized training modules, curated datasets, and collaborative networks for reporters focused on mining corruption and regulatory enforcement. By strengthening the media's ability to scrutinize mining operations and policies, such a platform could significantly enhance public accountability and elevate the quality of public discourse around natural resource governance.

The experts were also unequivocal in their view that technology alone cannot resolve the deep-rooted issues confronting Ghana's mining sector. Rather, digital tools must be embedded within a broader ecosystem of institutional and policy reform. In particular, there was a call for the Ghanaian government to demonstrate stronger political will in addressing entrenched corruption and regulatory capture. This would require updating and enforcing anti-corruption legislation that is specifically tailored to the complexities of the mining industry, including provisions around beneficial ownership disclosure, contract transparency, and sanctions for non-compliance. Equally important is the need to enhance the autonomy, technical capacity, and financial independence of oversight institutions such as the Minerals Commission and the Environmental Protection Agency. Without adequately resourced institutions, even the best-designed digital interventions will struggle to produce meaningful outcomes.

Finally, many informants highlighted the importance of institutionalizing inclusive, multi-stakeholder governance arrangements that go beyond symbolic consultation. They argued for the creation of permanent platforms that bring together government agencies, mining companies, traditional authorities, civil society organizations, and affected communities to engage in dialogue, policy development, and joint monitoring. Such platforms, if well-structured and genuinely representative, could help to reduce power asymmetries, build trust, and promote more equitable decision-making in the sector.

3.6 Recap of Expert Perspectives on Governance and Transparency in the Mining sector.

Expert perspectives on Ghana's mining sector highlight that, while the country has made notable progress in establishing regulatory frameworks and institutions, challenges related to governance and transparency persist. Ghana's Minerals Commission serves as the primary regulatory authority, overseeing licensing, monitoring, and compliance. The Ministry of Lands and Natural Resources provides policy direction, while the Ghana

Revenue Authority and the Environmental Protection Agency (EPA) play complementary roles in taxation and environmental oversight. Despite this relatively robust institutional architecture, experts point out that practical gaps remain. These include capacity constraints, overlapping mandates, and the influence of vested interests that can undermine regulatory effectiveness.

Stakeholders note that, although Ghana is a member of the Extractive Industries Transparency Initiative (EITI) and has made strides in disclosing contract and revenue data, issues such as limited local-level monitoring, weak community engagement, and inconsistent enforcement continue to hamper full transparency and accountability. One recurring insight is that governance challenges are often linked to the discretionary power embedded in licensing and permitting processes. While the Minerals Commission is designed to operate with operational independence, it remains susceptible to political and economic pressures that can distort fair and transparent administration.

Experts generally agree that strengthening existing institutions rather than creating parallel bodies is the more viable path to deepening transparency. Recommendations include modernizing the licensing process through digital systems, clarifying inter-agency roles to avoid duplication, strengthening community participation in monitoring, and enhancing the public availability of data related to mining contracts, revenues, and environmental performance. Overall, the Ghana case study underscores that robust governance in the mining sector depends not only on well-designed institutions but also on sustained political commitment, effective oversight, and active civic participation to hold both regulators and operators accountable.

3.7 Recommendations

Developing a transparent and inclusive digital ecosystem: Drawing on lessons from key informants and the governance experience of Ghana's mining sector, it is essential to adopt a more nuanced approach to using civic technology and open data to enhance accountability. . This strategy should be tailored to address the unique challenges and opportunities

within Ghana's context while also drawing inspiration from global best practices.

At the core of this approach should be the development of a comprehensive, user-friendly digital ecosystem that enhances transparency and facilitates public engagement. This ecosystem could begin with the creation of a centralized online repository for mining-related information, including contracts, licenses, and revenue data. However, it's crucial to recognize that merely making data available is not sufficient; the information must be accessible and understandable to a wide range of stakeholders, from local communities to international observers.

To achieve this, the platform should incorporate interactive data visualization tools that can translate complex mining data into easily digestible formats. These visualizations could illustrate the flow of revenues, the distribution of mining licenses, and the environmental impacts of mining activities. By making this information more accessible, the platform would empower citizens, journalists, and civil society organizations to play a more active role in monitoring the sector and holding actors accountable.

Empowering communities through civic technology: Recognizing the importance of local community involvement, as highlighted by the experts interviewed, the digital ecosystem should also include mobile-friendly tools that enable citizens to report illegal mining activities or environmental violations. This could take the form of a user-friendly app or SMS-based system, allowing even those in remote areas with limited internet access to participate in oversight efforts. Such a system would not only provide valuable real-time data to authorities but also foster a sense of empowerment among local communities, making them active participants in the governance of their natural resources.

However, it's important to acknowledge the potential challenges in implementing such technologies, particularly in rural areas with limited digital literacy or internet connectivity. Therefore, any digital solution should be complemented by capacity-building initiatives that equip local communities with the skills and knowledge needed to effectively use

these tools. This could involve partnering with local NGOs or community organizations to provide training and support.

Furthermore, to address the lack of specialized journalism in the mining sector, as noted by one of the experts, the digital ecosystem could include a dedicated platform for investigative journalists. This platform could provide access to specialized training resources, data analysis tools, and a network for collaboration among journalists focusing on mining-related corruption. By nurturing a community of skilled reporters, this initiative could help fill the critical gap in sector-specific investigative journalism.

While these technological solutions offer significant potential, they must be implemented within a broader framework of policy and institutional reforms. The experts interviewed emphasized the need for political will to combat corruption, suggesting that any technological solution must be backed by strong governmental commitment to transparency and accountability. This could involve updating anti-corruption legislation to specifically address challenges in the mining sector and ensuring that regulatory bodies have the mandate and resources to effectively use the data generated by these new digital tools. Moreover, the implementation of these technologies should be done through a multi-stakeholder approach, involving government agencies, mining companies, civil society organizations, and local communities. This collaborative approach would not only ensure that the solutions are tailored to meet the needs of all stakeholders but also foster a sense of shared ownership and responsibility for the governance of the sector.

In essence, while civic technology and open data offer powerful tools for enhancing accountability in Ghana's mining sector, their effectiveness will ultimately depend on how well they are integrated into the broader governance framework. By combining innovative digital solutions with targeted capacity building, policy reforms, and multi-stakeholder engagement, Ghana has the opportunity to set a new standard for transparency and accountability in the mining sector, not just in Africa, but globally.

Institutional commitment and multi-stakeholder collaboration:

To enhance multi-stakeholder collaboration in Ghana's mining sector, a comprehensive approach is essential, recognizing the complex interplay of interests, power dynamics, and existing institutional frameworks. This strategy aims to create a more inclusive, transparent, and effective governance structure that leverages the strengths of various stakeholders while addressing the challenges highlighted by industry experts. Central to this approach is the establishment of a formalized Multi-Stakeholder Mineral Exchange Platform (MSMEP) for the mining sector. This platform would serve as a centralized forum for dialogue, decision-making, and collaborative action among government agencies, mining companies, civil society organizations, local communities, and other relevant stakeholders. However, it is crucial to recognize that the mere creation of such a platform is insufficient; its design and implementation must carefully consider the unique context of Ghana's mining sector.

The MSMEP should be structured to ensure equitable representation and meaningful participation from all stakeholder groups. This entails moving beyond token representation to create mechanisms that amplify the voices of traditionally marginalized groups, particularly local communities affected by mining activities. For instance, the platform could incorporate rotational leadership roles, ensuring that different stakeholder groups have the opportunity to set agendas and lead discussions.

To address power imbalances often present in multi-stakeholder initiatives, the MSMEP should be supported by capacity-building programs tailored to the needs of different stakeholders. For local communities and civil society organizations, this might involve training in technical aspects of mining governance, negotiation skills, and data analysis. For government officials, it could focus on enhancing their ability to engage effectively with diverse stakeholders and interpret complex mining data.

The MSMEP should actively leverage technology to enhance collaboration. This could involve using digital platforms for remote participation in meetings, ensuring that stakeholders from remote areas can actively engage. It might also include developing mobile applications for real-time

sharing of information and feedback among stakeholders. Recognizing the global nature of the mining industry, the MSMEP should incorporate mechanisms for international collaboration. This could involve partnering with similar platforms in other countries to share best practices and address cross-border issues. It might also include engaging with international organizations and initiatives focused on responsible mining practices.

4.0 Case studies by country – Mozambique

4.1 Introduction

Mozambique is located on the southeast coast of Africa, bordering South Africa, eSwatini, Zimbabwe, Zambia, Malawi and Tanzania, with an Indian Ocean coastline of 2,470 km. Its location is strategic as four of the six countries with borders do not have access to the sea, and therefore depend on Mozambique for access to global markets. The country is endowed with important natural resources, such as arable land, forests, water, energy and mineral resources, including the third largest natural gas reserve on the continent, discovered in the Rovuma River basin, on the border with Tanzania, in the province of Cabo Delgado, in the north of the country. Over the coming decade Mozambique is expected to become a major liquified natural gas (LNG) exporter due to the discovery of over 180 trillion cubic feet (TCF) of natural gas reserves in the Rovuma basin in the north of the country. These discoveries are spread over two concessions; one led by Total Energies and the other jointly led by Eni and ExxonMobil. The U.S. Export-Import Bank has committed to loaning \$4.7 billion of the approximately \$20 billion investment into the Area 1 Mozambique LNG project led by Total Energies, while the U.S. Development Finance Corporation has extended \$1.5 billion in sovereign risk insurance to Exxon Mobil's Area 4 Rovuma LNG project, together representing the U.S. Government's largest investment commitment on the continent [62].

According to [63], Mozambique is the world's third-largest producer of graphite in 2023, with output down by 42.17% in 2022. Over the five years to 2022, production from Mozambique increased by a CAGR of 12% and is expected to rise by a CAGR of 13% between 2023 and 2027. The resource-

rich Cabo Delgado also hosts the Balama Graphite Operation (BGO), which is located approximately 260 kilometers west of the coastal city of Pemba in Balama District (Figure 5). The BGO is operated under a 25-year mining concession held by Twigg Exploration and Mining Limitada, a subsidiary of Syrah Resources Limited. The mining concession was granted by the Republic of Mozambique on December 6, 2013, and is valid until 2038. It grants Twigg the rights to explore and process graphite and vanadium over an area of 11,062 hectares. The mine, currently 5,812 hectares, is estimated to have a remaining life of 50 years (Mine Site Application Form June 6, 2022), with updates made annually depending on the global demand and supply in the graphite market [64].



Figure 5: Balama graphite operation site.

BGO's development began with exploration work by Twigg from 2011 to 2014, identifying three graphite ore bodies: Ativa, Mualia and Mepiche. Construction of the camp and site plant commenced in 2014, followed by the commissioning of the processing plant and first cell of the tailings storage facility (TSF) in 2017. Tailings Cell 1B was commissioned in 2018, Cell 2A in 2023. Cell 2B is currently under construction. Commercial production began in April 2018, with a processing plant designed to handle two million tons of ore per annum, which can produce up to 350,000 tons of graphite concentrate annually, with a carbon content ranging from 94%

to 98%. The processing involves conventional crushing, grinding, flotation, filtration, drying, screening, and bagging. Waste is stored in stockpiles and in an onsite tailings storage facility (TSF). The finished graphite products are transported by truck to the ports of Pemba and Nacala, from where they are shipped to customers worldwide. Up to 70 percent of the graphite produced at BGO is supplied to battery manufacturers [64, 65]. The Syara's BGO are backed by Washington as part of the federal support to bolster US domestic critical minerals supply chains. Graphite is used in electric vehicles and other batteries, as well as in nuclear reactors, cell phones, laptop computers, industrial processes, and high-performance engines. Given its widespread applications, a secure graphite supply chain is crucial to the US defense industrial base, yet the US in 2022 was 100 percent reliant on imports for its graphite needs. This project support is intended to provide an alternative to imports from China, the world's dominant producer and the US's primary import source for natural graphite [65, 66].

Apart from the BGO, the Cabo Delgado province also hosts the GK Ancuabe Graphite Mine, a subsidiary of German company AMG Graphit Kropfmuehl GmbH. The GK Ancuabe Graphite Mine invested 12 million euros in the recovery and expansion of the Ancuabe graphite mine and processing plant, which began operating in 2017. The unit associated with the mine is capable of processing 9,000 tones of graphite per year, with the resulting product destined for the German market. The mine is located in the district of Ancuabe, in Mozambique's Cabo Delgado province, known for containing large and high-quality graphite deposits, and GK Ancuabe Graphite Mine was the first mining company to extract and process graphite in Mozambique [64, 67, 68]. As noted by [63, 65, 69] the graphite mining operations in Cabo Delgado's province are still in an emergent stage. It's expected that more projects will become operational in the next few years. Key graphite mining projects currently in development in the country include the Ancuabe and Balama North projects owned by Triton Minerals, as well as the Montepuez and Balama Central Graphite projects under the ownership of Tirupati Graphite, which recently acquired these assets from Battery Minerals.

During a long period, the donor community generally considered Mozambique a development success story. Since the end of conflict in 1992, real Gross Domestic Product (GDP) growth (per capita) has been strong, easily outstripping the global average and surpassing many other countries in the region. However, while Mozambique's contribution to the "Africa Rising" narrative did not last long and today, Mozambique is no longer a star growth performer and lags behind its peers in the region, most notably Ethiopia [63, 64, 70]. It happens that despite the efforts of the international community to sustain the "Mozambican miracle" and the impressive average annual GDP growth of 7.2% in the 2000s, there was no structural economic transformation in Mozambique [65, 66, 71]. This growth trend was seen in the first decade and a half of the period (2000-2015), the economy was described as an example of economic success. However, this significant and sustained growth was interrupted in between 2015-2019, a period in which the economy grew at an annual average of 3.9%, reaching the lowest growth since 2000, 2.3% in 2019. The slowdown was, in part, caused by the dependence on external capital flows in the form of foreign aid, foreign direct investment and public debt, and by the concentration of production and trade in a small range of primary products for export [72-74].

The structural crisis of the accumulation pattern was exacerbated by the so-called "hidden debts" corruption scandal worth 2.2 billion dollars, which led to the cancellation of direct financing to the State Budget by the main development partners, including bilateral donors, the World Bank and the IMF. The cancellation of support for the OE left the economy in an unprecedented fiscal crisis, with impacts on social spending, particularly on health, education and public transport [75-77]. According to a report published in 2021 by the Maputo based Center for Public Integrity (CIP), the knock-on effects of such a huge corruption scandal may already have cost Mozambique at least USD 11 billion, nearly the country's entire 2016 GDP and almost 2 million people have been pushed into poverty [65, 68, 69, 76, 78].

Mozambique's real GDP grew by an estimated 5.0% in 2023, up from 4.2% in 2022, driven mainly by extractive industries as liquefied natural gas

processing matured in the Coral South Field. The extractive and service sectors were the main drivers of growth on the supply side, while private consumption drove growth on the demand side [64]. A fact that can be clearly observed in the Mozambican economy is that despite the abundance of natural resources, the effects of their exploitation are not felt in the lives of Mozambicans. Poverty remains high at an estimated 74.5% in 2023, with about 24 million people living in poverty. The employment rate fell from 75.6% in 2019 to 73.6% in 2020 as recent growth has not been inclusive [79]. Although this situation is set to change with the growing importance of the extractive industries, agriculture is still regarded as the basis of the country's development, employing more than 70 per cent of the labor force and contributing over 20 per cent of GDP [65, 71, 73]. This is by far the main source of employment in the economy, even not having regained its pre-COVID dynamism.

It is argued that in Mozambique, with its political patronage and clientelism, elite competition, limited productive base, weak state capacity, high level of poverty, and recurrent fiscal deficits, the prospects of the current resource boom leading to economic transformation, despite its considerable potential, are at best equivocal [70]. They add that although there reforms resulting in the growing contribution of the extractive sector to the economy, there are underlying dynamics undermine the prospects of the resources sector contributing to economic transformation, namely: (i) the absence of a strong institutional setting expressed in a resource-based strategy that plays the role of a binding set of norms and references for coordination of the various actors; (ii) the different strategies pursued by the political and economic actors, especially the political leadership and the government, the national entrepreneurial class (undercapitalized and more reliant on its political linkages), and the multinational companies with less incentive to invest in other areas than the extractives; and (iii) the structural dependence of the country on external resources, particularly FDI and its role in shaping the relations between international and domestic actors and influencing macroeconomic policies, especially monetary and fiscal policies, in ways that contradict the objectives of economic transformation.

4.2 Root causes and manifestations of corruption

Economic performance is impacted by weak governance and corruption through several channels, especially in the domains of fiscal, market regulation, financial sector oversight, and the rule of law. This undermines the society's trust in government, puts at risk the quality of public institutions, and gives rise to rent seeking behavior, eroding the general rule of law, and slowing overall economic development [65, 66, 75]. As pointed out by IMF, corruption and the deterioration of governance in Mozambique has several factors, such as: (i) a large informal economy with limited financial inclusion, which allows for a high share of cash transactions, and makes it difficult to track and control illicit transactions; (ii) a large, complex and obscure structure of beneficial ownership of state owned enterprises; (iii) a patronage political culture that often relies on the provision of benefits and public goods in exchange of political support; and (iv) weak and underfunded oversight and regulatory institutions.

One of the concerns for transparency in the extractive industry in Mozambique was linked to the disclosure of contracts, sales agreements and all addenda that generally come from these contracts between the government and companies. The publication of contracts is one of the requirements of the Extractive Industry Transparency Initiative (EITI), of which Mozambique has been part since 2011. The Law on public-private partnerships, the mining law and the petroleum law also determine the obligation to publish contracts. In fact, contracts signed between the government and oil and mining companies are made available on the MIREME website. An important advance towards transparency in mining contracts was the creation of the Mining Registry, through which the public can access mining titles and published contracts. Although transparency seems to be increasing in Mozambique's extractive sector, transparency alone does not generate accountability. Considering that anti-corruption laws and its enforcement is weak, there is a serious risk that in the coming years we will simply know in even greater detail the scale on which the political and economic elite in Mozambique is stealing the extractive sector wealth on which the future of all citizens depends [65]. Since 2012, the Mozambican anti-corruption legislation, partially pushed by Mozambican

civil society and partially by donors, has improved considerably, when the Legislative Anti-Corruption package, known in Portuguese as PLAC, was approved by the Parliament (Assembleia da República – AR). It consisted of the following laws:

- Law 14/2012 of 8th of February on the Organizational Structure of the Public Prosecutor and the Status of the Prosecutors. It also defines the crimes of embezzlement, deviation of public funds and assets, trafficking of influence and illicit enrichment.
- Law 15/2012, of 14th of August, on the Protection of Victims, Witnesses, Whistle-blowers and Experts in Criminal Proceedings. This piece of legislation, in Article 22, also foresees the establishment of a High Authority of Protection of Victims.
- Law 16/2012, of 14th of August, on Public Probity which stresses the supremacy of public over private interests. It defines conflicts of interests and prohibits the acceptance, by public office bearers, of gifts, facilities, etc., which might endanger the independent execution of public office. It also establishes the duty of office bearers to declare their assets and defines sanctions against those in violation of the stipulations of the Law. It also prescribes the establishment of the Central Commission of Public Ethics.

The PLAC has put in place a broad institutional anti-corruption architecture within the larger governance framework, where several institutions play specialized roles in the fight against corruption. The outcomes of these anti-corruption initiatives remain modest. According to the latest data from the Corruption Perception Index (CPI) 2024, Mozambique has a score of 25, with a change of 0 since 2023, meaning it ranks 146 out of 180 countries (Figure 6). This shows that even with the improvement of the legislative framework, corruption is still rampant, making Mozambique the fourth most corrupt country in southern Africa, behind Zimbabwe and Comoros (both with 158, with 21 points) and the Democratic Republic of Congo (163, 20 points).

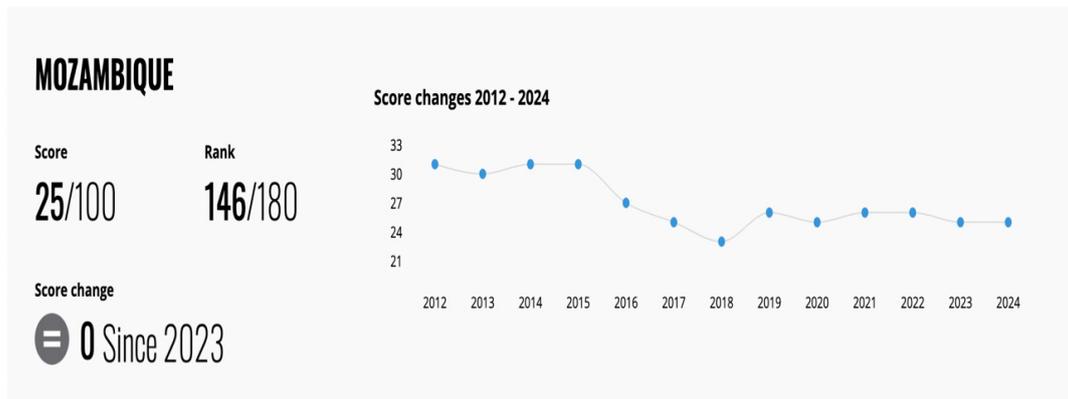


Figure 6: Corruption Perception Index (CPI) 2024. (Source: <https://www.transparency.org/en/countries/mozambique> [69]).

This trend is worrying and reveals that despite the evolution of the legal and institutional framework for combating corruption, combined with transparency and accountability initiatives, there has not been a correlation between these reforms and the reduction in corruption levels and improvement in institutional quality.

In 2022, Mozambique was put under increased monitoring (on the grey list) of the International Financial Action Group (FATF), due to strategic deficiencies that the country demonstrates in the fight against money laundering, the terrorism financing, and the proliferation of weapons of mass destruction, as the country is facing long-term terrorist attacks in the northern provinces. Among other aspects, the FATF analysis also noted that the Ministry of Finance is contracting goods and consultancy services, without obeying the rules for public contracting, which is problematic. There are ongoing actions that Mozambique is implementing to come off the FATF grey list, such as legal reforms to strengthen measures to prevent and combat money laundering and terrorist financing. However, there are gaps in application of the law which implies investigation and holding responsible those who commit such crimes. The government expected that the country should be removed from the “grey list” in the March 2025 assessment, although there was some progress on the matter.

4.3 Assessment of transparency and accountability mechanisms

In Mozambique, prevalence of corruption remains an area of concern for both the public as well as donors, who support almost half of the state's budget. Corruption manifests itself through various forms, including political, petty and grand corruption, embezzlement of public funds, and a deeply embedded patronage system. Checks and balances are weak, as the executive exercises strong influence over the legislative and the judiciary. The recent gas and oil discoveries and the potential of mining industries in increasing state revenues have raised discussions around the importance of establishing mechanisms ensuring more transparency and accountability in the extractive industries [80]. In addition to anti-corruption legislation, an important step towards promoting transparency and accountability in the extractive sector was the implementation of the Extractive Industry Transparency Initiative (EITI). The EITI is a global standard that aims to promote the open and responsible management of natural resources in implementing countries [65]. To this end, this standard requires the disclosure of information along the extractive industry value chain from the extraction phase, to how revenues are collected by the government and how they benefit the citizens of those countries.

Mozambique expressed, for the first time, its intention to join the EITI in May 2009. However, these intentions do not necessarily fit into a broad set of reforms that the government, deliberately, intended to implement to make the sector more transparent, and the influence of external factors must also be considered in the decision to implement this policy. Before submitting its application for membership, the government had already committed to donors to implement and become compliant with the EITI, as documented in the Government Letters of Intent dating from 2008 and 2010, in the context of its request for financial support from the International Monetary Fund (IMF) through the Policy Support Instrument program, signed by the then Minister of Finance, Manuel Chang and the former Governor of the Bank of Mozambique, Ernesto Gove.

Since the implementation of the EITI, Mozambique has faced difficulties in achieving and maintaining the status of a compliant country. In August 2011, after the publication of the first report, the EITI International Council decided to reject the country's candidacy due to non-compliance with some indicators that make up the validation matrix, having defined a set of corrective actions necessary to achieve compliant status. Once the corrections were made, in October 2012, the status of a compliant country was achieved, which means that the indicators established by the EITI standard were fully adhered to. Five years later, that is, in October 2017, a new assessment was carried out and the EITI International Council concluded that the country had made significant progress, but not sufficient to maintain its compliant status, and should once again carry out corrective actions in the areas in which it did not perform well.

A study carried out by [70] showed that although the EITI is an important tool for ensuring transparency and accountability in the governance of natural resources, concomitantly reducing the risks of the "resource curse", it does not necessarily constitute a panacea for the governance problems that affect countries rich in natural resources, such as Mozambique. Additionally, this study showed that although the EITI is an important tool for ensuring transparency and accountability in the governance of natural resources, concomitantly reducing the risks of the "resource curse", it does not necessarily constitute a panacea for the governance problems that affect countries rich in natural resources, such as Mozambique. As per detected in the EITI reports, one area of key concern and high corruption risk in the extractive sector was the financial relations between the State and the State Owned Enterprises (SOE) in the extractive industry. These financial relations, supported by Law No. 3/2018 as well as by Decree No. 10/2019, were not clearly defined when compared with the previous legislation of Public Companies, or that is, previously the transfer of profits to the state budget occurred on a proposal from the State apparatus body to which the state company was subordinate and the Ministry of Finance determined in each the amount to be transferred, being that, currently, the General Assembly of the companies is responsible.

Another key reform influenced by the EITI is the transparency of beneficial

ownership. This reform makes it possible to contribute to (i) promoting good governance and accountability in the extractive sector; (ii) dissuade corrupt practices in the allocation of extractive rights; (iii) prevent abuse of tax rules or tax evasion; and (iv) support efforts to resolve money laundering crimes and other financial crimes in the economy. In 2016, a roadmap was defined for the implementation of this reform and despite the obstacles initially faced, the country is currently at a very advanced stage. This reform is addressed in the Law to Prevent and Combat Money Laundering and Financing of Terrorism (Law no. 11/2022, of July 7). Additionally, it finds legal support in the Commercial Code, approved by Decree-Law no. 1/2024, of March 8th.

4.3.1 Analysis of secrecy in mining contracts and regulatory enforcement

The mining legal framework has been updated in recent years, mirroring the trends and the challenges of the industry and the economy. Currently, the major mining investments and projects in the mining sector are mainly directed towards graphite, precious and semi-precious stones, heavy sands and coal. Analyzing the mining legislation, it is possible to identify some corruption risks. For instance, it centralizes the awarding process and monitoring of all licenses, except Mining Certificate for Construction and Mining Pass, in the hands of the Minister of Mineral Resources and Energy, who can be subject to external influence. Additionally, the cadastre staff enjoy full discretion over the timing and duration of each step of the licensing process, creating an environment conducive to corrupt practices. In 2017, the Minister of Mineral Resources and Energy, Lectícia Klemens, acknowledged that signs of corruption in licensing have been detected, which are revealed mainly through acts that represent the abuse and use of public power to achieve personal gains or to satisfy private interests [81]. This is particularly significant considering that the lack of transparency and accountability in the awarding of mining sector licenses, permits and contracts – the first stage in the mining value chain – is a root cause of corruption in the mining sector. Yet other initiatives to improve governance and prevent corruption in extractive industries (oil, gas and mining) do not focus fully or exclusively either on the mining sector or this stage of the

value chain [81].

In this regard, the EITI made significant progress by incorporating the mandatory publication of contracts into its standard. The EITI requires the disclosure of information related to the management of the extractive sector, allowing interested parties to understand the laws and procedures for granting exploration and production rights, the legal, regulatory and contractual framework applicable to the extractive sector and the institutional responsibilities of the State in managing the sector. EITI requirements on the transparency of the legal framework and the granting of rights in the extractive industry include: (2.1) Legal framework and tax regime; (2.2) Granting of contracts and licenses; (2.3) License registration; (2.4) Contracts; (2.5) Beneficial owners; and (2.6) State participation in the extractive sector. The Mining Law establishes the different types of titles that allow their holder to carry out mining activities (Table 3).

Table 3: Types of mining titles in Mozambique: [65].

1. Strengthening governance and institutional frameworks.

| Mining Title | Description |
|----------------------------------|---|
| Prospecting and research license | The validity period of this license is as follows: 2 years for mineral resources for construction, renewable once, for the same period; 5 years for other mineral resources, including mineral water, renewable once for another three years. |
| Mining concession | The term of the mining concession is up to 25 years, and may be extended for an equal period, based on the economic life of the mine and compliance with legal duties by the mining holder. |
| Mining certificates | It allows small-scale mining operations to be carried out for a period of 10 years, extendable for equal periods, according to the economic life of the mine. |
| Mining passes | Holders of a mining concession, mining certificate or mining pass may carry out ore treatment activities, except in the cases expressly defined in the Mining Law and specific legislation. |
| Mining treatment license | Holders of a mining concession, mining certificate or mining pass may carry out ore treatment activities, except in the cases expressly defined in the Mining Law and specific legislation. |

| | |
|---------------------------------|--|
| Mining processing license | It allows mining operations to be carried out throughout the extractive industry chain, with a view to obtaining mining concentrate. |
| License to sell mining products | Allows the purchase and sale of mineral products that do not result from mining activities conducted under the terms of the mining concession, mining certificate and mining password, attributed to a natural or legal person, constituted among nationals and registered in accordance with the laws in force in the Republic of Mozambique. |

The Mining Law provides, in paragraph 4 of article 8, that mining contracts are made public in the Boletim da República, subject to prior approval from the Administrative Court, within 30 days. It can be seen in paragraph 5 of the same article that “Without prejudice to their publication in newspapers or websites, mining contracts, once approved, as well as their amendments, must be sent to the Assembly of the Republic for information”. In accordance with article 26 of the Mining Law Regulation, INAMI is responsible for ordering the attribution, modification, transmission and extinction of mining titles to be published in the Boletim da República, within a period of 30 (thirty) days from the date of occurrence of the facts subject to publication. And it is also up to INAMI to publish in the Boletim da República the declaration, modification and extinction of authorization and designated mining password areas. In light of these legal assumptions, to date, the Mozambican State has signed 14 mining contracts, which can be viewed on the website of the Ministry of Mineral Resources and Energy (MIREME) and the National Institute of Mines (INAMI).

4.4 Insights from key informant interviews

Graphite can play a significant role in Mozambique’s economic development, and it can become a powerful engine of growth for the country, mainly driven by increasing demand from various applications such as energy storage, electronics and composites. As demonstrated throughout the text, graphite is yet another strategic resource that Mozambique has, and with ongoing projects and new discoveries, the country can consolidate its position as one of the main global suppliers. But instead of just looking at the sector’s tax revenues, it is necessary to define policies that promote local development, structural economic transformation and industrialization.

This is a major challenge, especially considering that the high expectations for the exploitation of natural resources in Mozambique have not been met, creating a widespread environment of dissatisfaction in the resource-producing regions and frustration, especially among youth.

The first experience of extractives without development is seen in the province of Inhambane, in the gas projects of the South African company SASOL. In September 2000, the government signed an agreement with Sasol to develop the gas fields, build a pipeline and export gas to South Africa over a 25-year period. The proven gas reserves in Pande and Temane are about 3.5 trillion cubic feet, and with this agreement the country became the largest exporter of natural gas in the southern African region. This constitutes a paradigmatic example of contracts shielded from excessive tax benefits, harming revenue collection for the Mozambican State. Therefore, the deal benefits the economic interests of the South African counterpart and the Mozambican political elites, to the detriment of the Mozambican people. The second investment that frustrated citizens' expectations was the Brazilian mining company VALE. When the Mozambican government signed a contract with mining giant VALE, almost everybody in Mozambique believed that coal would develop the country. With an annual production of 11.3 million tones of coal, the company officially inaugurated the operations in May 2011, in the Moatize Coal Mine, Tete province. In 2021, VALE announced plans to pull out of the project and sold its assets to Vulcan Minerals for US\$270 million. The area of the concession today is still affected by a worrying pattern of violence, land-grabbing, death, pollution and more poverty to the communities, which lead to the idea that "VALE was a poisoned gift" to Mozambique [82]. The third investment that places the country in a situation of uncertainty about the future is in the large natural gas reserves in the Rovuma Basin, Cabo Delgado. Expectations regarding the country's development currently fall on these resources. However, the existence of these resources has been associated with some of Mozambique's main crises in recent years, namely, the hidden debt corruption scandal, which caused a decline in economic growth, foreign direct investment and tax revenues; and the violent extremism that has plagued the northern province of Cabo Delgado since October 2017.

These experiences show that Mozambique is already an example of a country rich in natural resources, but their exploitation is not reflected in improving the living conditions of its citizens. In part, this happens due to institutional problems, especially corruption. Therefore, for the graphite industry to promote development, the country must change its approach to avoid repeating the mistakes of the past. The multinational companies are also called to contribute to this endeavor. It is urgent that they commit to being more transparent and accountable in their operations, respect human rights and commit to local development through job creation in local communities.

4.5 Recommendations

Strengthening governance, transparency and institutional integrity: Mozambique's abundant natural resources, particularly its graphite reserves, provide a significant opportunity for economic transformation. However, past experiences have shown that resource wealth alone does not guarantee widespread prosperity. The country has struggled with governance challenges, corruption, and a lack of institutional capacity, which have hindered the equitable distribution of benefits from its extractive sector. Addressing these issues requires a multifaceted approach that prioritizes transparency, economic diversification, social inclusion, and environmental sustainability.

The governance of Mozambique's extractive sector must be strengthened to ensure that mineral wealth benefits all citizens rather than a select few. Transparency in mining contracts and licensing processes is essential to prevent opaque dealings that favor private interests over national development. Reducing corruption risks requires more stringent oversight mechanisms, including decentralizing decision-making processes and bolstering the independence of regulatory institutions. The disclosure of beneficial ownership structures is also crucial to combat conflicts of interest and illicit financial flows. A more accountable mining sector will encourage investor confidence while ensuring that revenue from natural resources contributes to national development.

Promoting economic diversification and local value addition: To fully

harness its graphite resources, Mozambique must pursue economic diversification and local development. It is imperative to develop policies that promote local content, ensuring that mining companies source materials and services domestically. This will stimulate local industries and create employment opportunities. Additionally, the country should prioritize value addition through a national graphite beneficiation strategy that supports refining and battery production rather than the mere export of raw materials. Small-scale and artisanal miners must also be integrated into the formal economy through technical training, financial incentives, and formalization programs. By doing so, Mozambique can foster a more inclusive and resilient mining sector.

Ensuring social inclusion, revenue accountability and environmental protection: Ensuring equitable revenue distribution is critical to addressing the socioeconomic disparities that have historically plagued resource-rich regions. Mining revenues must be transparently managed and allocated to infrastructure, healthcare, and education, with an emphasis on benefiting communities most affected by extractive activities. Establishing community development agreements between mining firms and local communities will help ensure that mining operations contribute directly to social and economic development. Strengthening public financial management systems will further enhance accountability and prevent revenue leakages that undermine national progress.

Environmental sustainability must be at the core of Mozambique's mining policies. Stronger regulatory enforcement is necessary to ensure compliance with environmental impact assessments and mitigation plans, reducing ecological damage caused by mining operations. Companies must be held accountable for fair compensation and livelihood restoration programs when communities are displaced due to mining activities. Encouraging responsible mining practices, such as adherence to international sustainability standards, will help mitigate social and environmental risks while maintaining Mozambique's global competitiveness in the mining industry.

Building long-term stability through security and institutional capacity: Security challenges in mining regions, particularly in Cabo Delgado, pose a

significant threat to the stability of the extractive sector. The government must enhance law enforcement capabilities to mitigate insurgency risks and illegal mining activities. Strengthening collaboration with international partners will also be necessary to address cross-border mineral smuggling and illicit financial flows that weaken national economic integrity.

The long-term success of Mozambique's mining sector depends on the strength of its institutions and regulatory frameworks. Capacity-building efforts should be directed toward government agencies overseeing the extractive industry, ensuring that they have the necessary technical and financial resources to enforce regulations effectively. Civil society organizations and the media must be empowered to hold both the government and corporations accountable for their commitments. Additionally, regional collaboration with neighboring countries will help harmonize mining regulations and create a more stable investment climate.

Mozambique's graphite and broader extractive sector have the potential to drive sustainable economic growth, but this will only be realized through deliberate and strategic governance reforms. Avoiding the pitfalls of previous resource booms requires a commitment to transparency, economic planning, and social and environmental protections. By implementing these measures, Mozambique can transform its mineral wealth into a driver of national development and poverty reduction, ensuring that the benefits of resource extraction reach all segments of society.

5.0 Case studies by country – Democratic Republic of Congo (DRC)



5.1 Introduction

The global transition from fossil fuels to renewable energy is central to mitigating climate change and achieving sustainable development, with critical minerals playing an indispensable role in this process. Critical minerals such as cobalt, copper, lithium and rare earth elements are needed for electric vehicles (EVs), renewable energy storage systems, and

other clean energy technologies[83]. Against this backdrop, the Democratic Republic of the Congo (DRC) stands out as a country with potential to support this energy transition through its vast mineral wealth, particularly in cobalt and copper, which are both critical for lithium-ion batteries and renewable power systems.

The DRC’s enormous mineral endowment, which includes significant deposits of cobalt, copper, coltan, gold, tin, and tungsten, marks the country as one of the world’s foremost mining frontiers. DRC’s mineral resources are largely concentrated in the copper belt in the southeastern Katanga region, where decades of mining activity have established it as a key supplier in the global market, with DRC now supplying more than 70% of the world’s cobalt[84].

Table 4: Cobalt mined in DRC versus rest of the world (thousand tons)

| Year | Global Production | DRC Production | Percentage of Global Production |
|------|-------------------|----------------|---------------------------------|
| 2000 | 36.9 | 7 | 9.7% |
| 2005 | 57.5 | 22 | 42.7% |
| 2010 | 89.5 | 47.4 | 53.0% |
| 2011 | 109 | 60 | 55.1% |
| 2012 | 110 | 60 | 54.5% |
| 2013 | 110 | 54 | 49.1% |
| 2014 | 123 | 63 | 51.2% |
| 2015 | 126 | 63 | 50.0% |
| 2016 | 110 | 64 | 58.2% |
| 2017 | 140 | 90 | 57.1% |
| 2018 | 120 | 73 | 71.4% |
| 2019 | 144 | 100 | 69.4% |
| 2020 | 140 | 95 | 67.9% |

Source: World Bank (2021)

About 88 percent of the DRC’s cobalt output is derived from large-scale industrial operations managed by leading multinational mining firms, while artisanal miners supply the remaining 12 percent. According to official ministry figures, out of 61 active cobalt mines in the DRC, Chinese corporations operate 76%, Glencore holds 10%, and the balance is managed by mining entities from Australia, Kazakhstan, India, and the

state enterprise Gécamines[85]. DRC is also the leading African producer of copper and the fifth globally.[86]

The DRC's mineral wealth has enormous strategic and economic implications for both the country and the global market. Globally, the surge in electric vehicle adoption and renewable energy investments is expected to intensify demand for cobalt and copper, positioning the country as a cornerstone supplier for the international clean energy supply chain. Projections indicate continued expansion in global EV markets. Some sources suggest that EVs will make up nearly half of new vehicles sold in the world starting 2035, with total vehicles sold hovering between 100 and 128 million units sold annually (BMI, 2020). This projected growth is creating a need for countries to secure resilient and ethically sourced mineral supply chains.[87]

However, despite this mineral endowment which makes DRC central to the global energy transition, the DRC's journey toward harnessing its mineral potential has been challenged by long-standing issues in governance, infrastructure, and regulatory enforcement. Chronic issues such as corruption, artisanal and informal mining practices, and conflicts linked to resource exploitation have historically undermined the sector's efficiency and transparency.[88] Infrastructure deficits, from inadequate transport networks to unreliable energy supplies, further hinder effective extraction and value addition. The DRC's supply chain is also deeply affected by organized criminal activity, including illegal mining operations, smuggling networks, and coordinated involvement between illicit miners, criminal syndicates, and state-affiliated individuals who facilitate and profit from the mineral's extraction and trade[89].

Despite the current challenges, the potential of the DRC's mining sector to underpin economic transformation remains substantial. Addressing these challenges through comprehensive policy reforms, robust regulatory oversight, and targeted infrastructure investments is crucial not only for optimizing mineral production but also for spurring sustainable industrial growth and socio-economic development. With renewed focus on value addition, involving local beneficiation processes and downstream industrial

development, the nation could elevate its role beyond a raw materials exporter, fostering industrial growth and economic development.

In this era of rapid global energy transition, the DRC faces both significant opportunities and formidable obstacles. Unlocking its full mineral potential while ensuring environmental sustainability and socio-economic inclusiveness will demand coordinated efforts by policymakers, industry participants, and local communities. With strategic investments in modern mining infrastructure, regulatory reforms, and transparent governance mechanisms, the DRC can position itself as an essential partner in the global pursuit of a low-carbon and sustainable future.

5.2 Root causes and manifestations of corruption

Corruption in the DRC's mining sector is deeply rooted by factors such as institutional overlap, weak enforcement, security-sector collusion, entrenched elite capture, and legal ambiguity[90]. At the heart of the problem lies the fragmentation of responsibility across multiple agencies that all claim authority over different aspects of mining and the environment. With so many bodies empowered to regulate the same activities, no single agency has clear jurisdiction, and companies have exploited this confusion over the years to secure licenses under ambiguous mandates, and environmental safeguards continually fall through the cracks.[91]

Compounding this institutional chaos is the routine failure to enforce laws on the ground. Although environmental inspections and social impact assessments are mandated by the Mining Code, in practice they rarely occur, especially in the eastern provinces, because inspection teams lack funding, staff, and political backing. The delayed response to violations at mining sites in the southeastern regions is not uncommon, leaving illicit operations to flourish[92].

Into this vacuum step elements of the security forces, who extort bribes from miners and trading intermediaries, imposing an informal "tax" system that undermines legitimate oversight and entrenches unpredictable, often violent, local power dynamics[93]. Far from protecting communities,

these security actors become part of the corrupt network that enriches itself at the expense of both workers and the state. Security forces in the DRC, including both the military and the police, have been deployed at mining operations, where they not only secure the sites but also disperse gatherings, using tactics such as physical force and tear gas against workers and bystanders, irrespective of their involvement in any protests. [94] Security forces, especially those at the borders, have also contributed to cobalt smuggling from the DRC, as they are often susceptible to bribes, reportedly aware of the vehicles used by smugglers and willing to overlook illegal activity in exchange for kickbacks. In some cases, soldiers and law enforcement officers even offer protection to smugglers transporting cobalt across borders.[95]

Meanwhile, at the top of the system, political and corporate elites collude to siphon off vast mining revenues. Years of political instability and shifting power dynamics have weakened the rule of law in the DRC. The politicization of resource allocation is further exacerbated by patronage networks where mining contracts are used as political currency. Cases abound where mining contracts have been allegedly awarded to companies with strong political ties, bypassing competitive bidding processes. Such instances not only distort fair market practices but also contribute to an entrenched culture of impunity.[96]

Although the state-owned mining company, Gécamines, is nominally tasked with managing a share of production, audits have repeatedly uncovered missing funds and unaccounted advances. Global analyses estimate that hundreds of millions of dollars in royalties simply vanish each year, while illicit exports of copper and cobalt can exceed ten billion dollars in value.[97] Such elite capture not only starves public coffers of critical revenue but also erodes the DRC's capacity to fund health, education, and infrastructure, feeding a vicious cycle of underdevelopment and dependence on extractive rents.'

At the other end of the spectrum lies the artisanal and small-scale mining sector, responsible for a significant portion of the country's cobalt output. Approximately 1.5 million Congolese depend on ASM, which often operates

outside the formal regulatory framework.[98] Largely unregulated, artisanal operations are overseen by informal networks of middlemen, local officials, and armed groups who facilitate smuggling, trafficking, and local extortion. Miners work in dangerous conditions, pay bribes to carry out extraction, and see little to no benefit from the global price spikes their labor generates.[99]

A significant portion of cobalt extracted from hard-to-reach, unauthorized sites goes unrecorded and is difficult to trace. Through corruption and smuggling, this unaccounted cobalt is integrated into the formal global supply chain. This illegally mined cobalt is frequently transported to licensed sites where it is certified by the Congolese Ministry of Mines, often with the complicity or negligence of public officials. These practices persist due to widespread corruption, weak regulatory enforcement, and limited government oversight, making it challenging to monitor the movement of cobalt from artisanal miners to multinational corporations[100]. This informality not only deprives the state of revenue but also entrenches patterns of local exploitation and environmental degradation.

Finally, the DRC's legal framework itself often fails to deliver on its promise. While recent code revisions mandate environmental impact studies, community consultations, and post-mining rehabilitation, these requirements are largely "on paper" because they were drafted without sufficient input from affected provinces or civil society. Top-down legislation, designed in isolation from the realities on the ground, lacks the mechanisms and resources to translate into meaningful protection or accountability. Without participatory law-making and dedicated enforcement funding, even the strongest statutes remain hollow, leaving local communities and the environment vulnerable to unchecked extraction.

Together, these interlocking weaknesses create a system in which corruption is not an aberration but the norm.

Manifestations of corruption: Corruption manifests clearly in the processes of licensing and permits approvals. Mining licenses are frequently obtained through bribery, with state officials demanding under-

the-table payments in exchange for expediting procedures. Numerous instances of collusion between high-ranking government officials and mining companies have been documented, where lucrative contracts are negotiated in secret and diverted into private accounts.[101] For example, In May 2022, Glencore admitted in a U.S. court that it had disbursed over USD 27.5 million in bribes to Congolese officials via third parties in order to obtain “improper business advantages,” and agreed to pay approximately USD 1.5 billion in fines and penalties[102]. Later that year, in December 2022, Glencore reached a settlement with the DRC government, committing to pay USD 180 million “covering all present and future claims arising from any alleged acts of corruption” between 2007 and 2018. Swiss authorities subsequently imposed a further USD 152 million penalty in mid-2024, drawing a line under historical corruption allegations related to the bribery of Congolese public officials.[103] Investigations by Global Witness and RAID have revealed that such practices diverted up to USD 750 million in royalties from the state treasury between 2013 and 2015. [104] These practices create a parallel economy that deprives the state of substantial revenue.

Corruption in DRC’s mining sector further manifests through intentional underreporting of production levels. Underreporting of mineral production is a widespread tactic aimed at minimizing tax liabilities. In many instances, companies deliberately declare lower production figures to reduce their fiscal obligations, a practice that results in significant losses for the state treasury. Revenue losses due to underreporting in the DRC’s mining sector could run into hundreds of millions of dollars annually, severely curtailing funds available for public investment. In July 2022, the DRC government imposed a ten-month export ban on the Tenke Fungurume mine (owned by CMOC) after accusing CMOC of under-reporting its copper-cobalt reserves to avoid higher royalty payments. The ban stemmed from a dispute between CMOC and the DRC state-owned miner Gecamines, who held a minority stake in the mine.[105] The DRC government claimed CMOC was deliberately understating reserves to pay lower royalties

Corruption also fuels a robust black market for minerals. Smuggling operations are common, with minerals like cobalt and coltan often moved

across porous borders using falsified documentation, most time operating in collusion with corrupt customs officials.[106] Such illicit trade channels not only strip the state of revenue but also bypass critical quality and ethical controls, thereby undermining the integrity of supply chains in global markets.

In regions where state control is weak, armed groups have leveraged mineral wealth to finance their activities. The proliferation of “conflict minerals” not only undermines legitimate economic development but also fuels prolonged violence and instability. Numerous documented cases show that rebel groups in the eastern DRC have at different points negotiated directly with mining companies for a share of extracted minerals, further entrenching corruption and complicating attempts at reform.[107] These transactions often occur in parallel with state-sanctioned mechanisms, blurring the line between legal operations and criminal enterprises.

Corruption in the mining sector directly impacts local communities. Forced displacement, often accompanied by inadequate resettlement and compensation, has become a grim reality in many mining regions in DRC.[108] In one illustrative case documented by Amnesty International in 2022, residents in a mining-affected village in Katanga were abruptly evicted to make way for an extraction project awarded under questionable circumstances.[109] Such incidents contribute to long-term social unrest and erode trust between communities and the state.

These mining projects have also spurred serious environmental degradation. Unregulated mining operations have led to extensive deforestation, water contamination, and soil degradation. For instance, satellite imagery analyzed by environmental watchdog groups has revealed significant deforestation in the mining zones of southeastern DRC, correlating with areas known for lax enforcement and rampant corruption.[110] In 2023, an environmental impact report highlighted how poorly managed mining activities were responsible for contaminating local water supplies, leading to severe public health crises in nearby communities.[111]

5.3 Assessment of transparency and accountability mechanisms

In recent years, the DRC has made notable attempts to reform its legal framework for mining. Updates to the Mining Code were aimed at clarifying licensing procedures, mandating the disclosure of contracts, and setting out clear rules for revenue sharing and environmental protection. For example, provisions have been included that require mining companies to publish information regarding royalty payments and contract terms. [112] The objective was to create a more traceable fiscal environment and reduce room for discretionary decisions by government officials.

However, while these legal reforms set a strong foundation on paper, their implementation has often been hampered by several factors, including weak enforcement and fragmented institutional mandates.[113] The resultant effect is that licensing and contract awards remain opaque, and environmental and social impact studies are not consistently made public. This gap between the Mining Code's intentions and its enforcement undermines efforts to remove the opacity that still surrounds many state-owned enterprises' operations.

Enforcement agencies also remain underfunded and understaffed. Although regulations call for strict oversight, routine inspections are inconsistent, which has allowed gaps for underreporting and selective enforcement.[114] The Ministry of Mines, provincial authorities (especially in mineral-rich Katanga), and revenue bodies sometimes work in silos. This fragmentation leads to overlapping responsibilities and inconsistent application of the new rules, much like challenges seen in other countries in the region.

To address these enforcement challenges, the government has experimented with digital initiatives. Pilot projects in online cadastre systems have demonstrated that digital systems can improve data accuracy and reduce instances of double licensing. In some mining areas, local communities have benefited from clearer information on which firms hold concessions, helping to expose irregularities. In theory, a centralized digital database could reduce the potential for manipulation and provide

both the public and oversight bodies with reliable, up-to-date information. The DRC has made strides by launching an online cadastre that lists each mining title's type, licensee, validity period, and application and award dates. However, this information remains incomplete and is dispersed across multiple government sites rather than consolidated in one place. For example, beneficial ownership details required under Article 7 of the Mining Code are only sporadically published, and mineral reserve figures on the National Agency for the Promotion of Investments' website are outdated. Financial and export data are similarly split between the EITI portal and the Ministry of Mines site, making it difficult to get a full, up-to-date picture of the sector without navigating several different platforms. [115]

The Extractive Industries Transparency Initiative (EITI) has played a significant role in shaping fiscal transparency in the DRC. By becoming an EITI member in 2005, the government signaled its commitment to greater transparency in natural resource management, most notably through the public disclosure of mining data in line with the 2019 EITI requirements.[116] As part of its EITI commitments, the DRC is required to publish detailed reports on revenue collection, mining contracts, and fiscal flows. These reports provide an external benchmark to assess whether mining revenues are properly accounted for. Since joining EITI, the DRC has increased public disclosure of mining-related data, and external audits have occasionally highlighted improvements in reporting standards compared to previous years.[117] This increased visibility has allowed international donors and civil society to identify discrepancies and pressure the government for corrective actions. Despite these efforts, EITI assessments have found that the scope of disclosed data often omits key informal sectors (particularly artisanal and small-scale mining), leaving significant portions of the sector unmonitored. Moreover, enforcement of EITI findings is non-binding; while irregularities are documented, there are no automatic sanctions.[118] This gap reduces the initiative's overall impact on curbing corruption.

International financial institutions such as the International Monetary

Fund (IMF) and the World Bank have tied financial support to stronger governance standards.[119] The DRC's application for credit and fiscal support has increasingly emphasized the need to adhere to transparency benchmarks, including those set by the EITI. This conditionality has led to periodic adjustments in policy, with some reforms receiving additional support in order to improve compliance. External agencies routinely monitor compliance, publish independent reports, and recommend corrective measures.[120] Nonetheless, donor-driven reforms are sometimes perceived as externally imposed, and without internal political will, they often struggle to become fully institutionalized. Local stakeholders have argued that these initiatives, while well-documented in annual reports, fail to translate into everyday accountability at the mining sites.

Local civil society organizations (CSOs) and advocacy groups have increasingly become watchdogs over the mining sector. They collect information, monitor revenue reports, and publicize cases of underreporting and contract opacity. CSOs in the DRC have collaborated with international networks to compare government data with company disclosures and independent audits. CSOs have spearheaded campaigns demanding that all mining contracts be made publicly accessible.[121] These campaigns often incorporate media reports and community testimonies to demonstrate how revenue mismanagement directly impacts local livelihoods.[122] Training initiatives sponsored by both local groups and international donors have enhanced the technical abilities of CSOs to interpret mining contracts and audit revenue reports, thereby increasing their ability to hold authorities accountable. Despite the proactive measures, many local CSOs cite significant difficulties in obtaining timely, comprehensive data from government sources. This problem is compounded by slow updates to digital transparency platforms.

In a context where “government always has something to hide,” CSOs also face political resistance and sometimes direct threats from powerful interests. This resistance limits their operational capacity and curbs their public influence. Over several reporting cycles, the DRC has shown incremental improvements in transparency, particularly in fiscal data

disclosure under the EITI.[123] This progress has provided a clearer picture of revenue flows and has occasionally resulted in targeted corrective actions recommended by EITI independent assessments. However, there is need for stricter enforcement for disclosures and consequences for shortcomings. The absence of automatic sanctions for EITI-reported irregularities means that even well-documented cases of non-compliance often go unpunished.

5.4 Perceptions of experts and industry analysts on governance challenges

Governance challenges in the Democratic Republic of Congo's (DRC) extractive sector continue to impede the equitable development of its vast critical mineral resources. Experts and industry analysts agree that deficiencies in transparency, weak oversight mechanisms, pervasive political interference, and inadequate stakeholder engagement have long compromised the effective management of the country's critical mineral wealth.

A central concern among experts is the persistent opacity in contractual agreements and revenue reporting. Analysts note that despite recent legal reforms mandating the disclosure of mining contracts, many details such as royalty rates, environmental commitments, and social obligations remain undisclosed. This lack of transparency often results in disputes over revenue sharing and fuels corruption. For instance, industry specialists have highlighted that without a centralized public repository it is difficult to verify whether the state is receiving its rightful share of revenues. The absence of full contract disclosure creates room for hidden agreements and revenue leakages, which ultimately undermines public trust.

Experts also emphasize that the fragmented oversight architecture in the DRC exacerbates governance challenges. This division of duties often leads to inconsistent enforcement of regulations. For example, reports indicate that inadequate resources and technical capacity limit routine inspections and timely follow-up on irregularities.[124] Without robust and coordinated oversight, even the best legal frameworks remain ineffectual,

allowing unregulated operators to exploit regulatory gaps.

Political interference, notably in licensing and contract awards, has also been frequently cited by experts as a major barrier to governance reform. Many industry observers point out that political patronage continues to influence decisions within state-owned enterprises (SOEs), such as Gécamines, where opaque financial reporting and preferential treatment are widespread. This has resulted in instances where concessions are granted not based on commercial merit but on political connections, thereby perpetuating a cycle of corruption. Political interference not only distorts the allocation of mining rights but also erodes accountability, as state officials often prioritize personal or political interests over public good.

Experts further note that there is a failure to incorporate meaningful stakeholder input in governance in the extractive sector. Experts note that local communities who bear the environmental and social costs of mining are rarely involved in decision-making processes. This marginalization contributes to social unrest and deepens distrust between communities and the state. Analysts have recommended the adoption of comprehensive Community Development Agreements (CDAs) to ensure that local voices are heard and that revenue benefits are distributed more equitably.

In summary, experts and industry analysts perceive the governance challenges in the DRC's extractive sector as multifaceted and deeply entrenched. To transform its extractive sector into a driver for sustainable development, the DRC must adopt a comprehensive reform agenda that strengthens regulatory institutions, ensures full transparency in mining operations, and actively incorporates the voices of affected communities. Only through such integrated efforts can the nation hope to secure its mineral wealth for the benefit of all its citizens.

5.5 Recommendations

Despite its vast and strategic mineral wealth, the Democratic Republic of Congo's extractive sector continues to be undermined by fragmented oversight, opacity in revenue reporting, and systemic corruption. To unlock the full potential of its resource base and drive sustainable national development, the following policy recommendations are proposed.

Establish and Enforce Anti-corruption mechanisms tailored to the mining sector: The DRC government should introduce targeted policies and institutional frameworks to curb corruption across the mining value chain. This includes setting up independent anti-corruption task forces with a mandate to investigate and prosecute bribery, illicit licensing, and rent-seeking behavior by state officials and private actors.

Reform the Mining Licensing Regime: The DRC government should amend the Mining Code to clearly delineate the role of Gécamines, the state-owned mining company, limiting its discretionary powers in the initial allocation of mining licenses. Instead, its role should be confined to commercial operations, while licensing decisions are handled by independent regulatory authorities. This should also be complemented with full implementation of the Mining Code's provisions that mandate competitive bidding for the award of mining rights. All tenders should be publicly announced, with clearly defined evaluation criteria, timelines, and results published to ensure fairness and accountability. The government should also consider replacing the current opaque bidding process with a "first-come, first-served" licensing model under strict eligibility and pre-qualification standards. This system would reduce opportunities for backdoor deals and simplify oversight by making licensing more predictable and less subject to manipulation.

Mandate Regular Publication and Independent Audit of State-Owned Enterprises (SOE) Finances: The DRC government should require all state-owned mining enterprises to publish quarterly financial statements,

production figures, and debt obligations on a public portal. Internationally accredited auditors should be engaged each year to verify these reports, and mandate that audit findings be tabled before Parliament within 60 days of completion.

Advancing Digital Transparency and Data Integration: A robust, digital transparency system is essential for accountability. The DRC should partner with an open-data platform provider to integrate all extractive sector information, including licensing, production volumes, export data, environmental compliance, into a single, user-friendly portal. This should be piloted in one key province, incorporate user feedback, and roll out nationally within nine months, supported by training for provincial mine offices. Mining companies must be required to submit detailed payment data, on royalties, taxes, and so on, broken down by project and province within 30 days of quarter end. The Ministry must then consolidate and publish these reports online, enabling citizens and oversight bodies to trace revenue flows in near real-time, which will reduce opportunities for opaque dealings

Ensuring Environmental Sustainability and Security Sustainable extraction practices are non-negotiable for the long-term viability of the sector. Enforcing robust Environmental Impact Assessments (EIAs) and establishing an Environmental Restoration Fund will help mitigate negative ecological impacts. Licensing regulations should be amended to make timely publication of Environmental and Social Impact Assessments (ESIAs) and Environmental Management Plans (EMPs) a pre-requisite for both new licenses and renewals. The government should implement a digital tracking system to flag non-compliant companies and automatically impose graduated fines or suspension of operations after specified deadlines. Simultaneously, improving regional security through enhanced law enforcement and international collaboration will curb illegal mining and smuggling, thus ensuring that the environmental and social costs do not outweigh the economic benefits.

Strengthen Independent Oversight Institutions and Improve Capacity for

On-the-Ground Enforcement: Provide dedicated, ring-fenced funding and legal protections to key oversight institutions such as the anti-corruption agencies. These bodies must be independent from political interference and empowered to investigate and prosecute corruption cases in the mining sector. This should also be matched with improved capacity and resources for on-the-ground reporting. The government should increase funding and staffing for provincial and national mining inspectors, environmental officers, and social impact monitoring teams. These field personnel should be well-trained, equipped, and paid competitively to reduce susceptibility to bribery and enable regular, unannounced site inspections.

Promoting Social Inclusion and Equitable Revenue Sharing: Inclusive governance demands that local communities benefit from mining operations. Implementing strict Community Development Agreements (CDAs) is fundamental; ensuring a predetermined share of revenues goes toward local development projects such as healthcare, education, and infrastructure. Further, a multi-Stakeholder forum can facilitate inclusive dialogue between government authorities, industry stakeholders, and community representatives, helping to align resource management with the development needs of affected populations.

6.0 Cross cutting comparative analysis: Critical minerals and the energy transition in Nigeria, Ghana, DRC and Mozambique



The energy transition has spurred demand for critical minerals such as lithium, graphite, cobalt, and rare earth elements (REEs), essential for clean energy technologies. Ghana, Nigeria, DRC and Mozambique, all endowed with rich mineral resources, are positioned to play significant roles in global supply chains. However, governance challenges, transparency issues, and socio-economic factors impact their ability to harness these resources effectively. This analysis examines key findings from each country and identifies cross-cutting trends shaping their resource sectors.

6.1 Nigeria: Opportunities and challenges in the critical mineral sector

Nigeria possesses significant deposits of lithium, cobalt, REEs, and other minerals critical to clean energy. Despite its mineral wealth, the sector remains underdeveloped, contributing less than 1% to GDP due to corruption, weak regulatory enforcement, and infrastructure deficits.

- **Potential for Economic Diversification:** Nigeria's lithium resources could support battery production, aligning with global EV market expansion. However, the country has yet to establish domestic processing facilities for value addition.
- **Regulatory and Governance Issues:** Corruption in licensing, informal mining, and smuggling weaken resource governance. The Nigerian Extractive Industries Transparency Initiative (NEITI) reports revenue losses due to illicit mining activities.
- **Infrastructure and Energy Constraints:** Inconsistent power supply and poor transport infrastructure limit efficient mineral extraction and processing.
- **Environmental and Social Impacts:** Unregulated artisanal mining contributes to deforestation, water pollution, and land degradation.
- **International Interest and Competition:** While China dominates the global EV supply chain, Nigeria has an opportunity to strategically position itself in global critical mineral trade through investments and policy reforms.

6.2 Ghana: A mature mining industry with governance challenges

Ghana is a leading African mining nation, historically focused on gold but increasingly exploring lithium, manganese, and bauxite. The country's mineral governance frameworks are more developed than Nigeria's but still suffer from political interference and transparency gaps.

- **Lithium and Manganese in Energy Transition:** Ghana's lithium discovery in the Ewoyaa region, valued at USD 150 billion, presents economic opportunities. Manganese, a key component in lithium-ion batteries, has been a cornerstone of the country's mining sector.
- **Governance and Corruption Concerns:** Licensing decisions often favor

politically connected individuals rather than transparent bidding processes. This patronage system distorts market fairness and limits revenue generation.

- **Chinese Influence in Resource Extraction:** Ghana's manganese sector is heavily reliant on China, which accounts for over 96% of its exports. This economic dependence poses risks in the event of fluctuating Chinese demand or policy shifts.
- **Environmental and Social Impacts:** The expansion of mining activities has led to deforestation and conflicts over land rights. Local communities often face displacement without adequate compensation or sustainable alternatives.
- **Regulatory and Transparency Efforts:** Ghana is an Extractive Industries Transparency Initiative (EITI) member, but enforcement remains weak. Initiatives such as the Agyapa Royalties Deal and lithium licensing have faced scrutiny due to governance concerns.

6.3 Mozambique: Strategic positions in the global graphite supply chain

Mozambique is a rising player in the critical minerals market, particularly in graphite and liquefied natural gas (LNG). Its reserves in Cabo Delgado position the country as a key supplier for battery-grade graphite.

- **Graphite's Role in the Energy Transition:** Mozambique is the world's third-largest graphite producer, with Balama Graphite Operation being a major supplier. The global push for EVs and energy storage technologies increases demand for Mozambique's resources.
- **Security Risks and Resource Governance:** Unlike Ghana and Nigeria, Mozambique faces significant security threats in its mineral regions, particularly from insurgent activities in Cabo Delgado. These threats disrupt mining operations and deter investors.
- **Infrastructure and Market Access Challenges:** The country's reliance on foreign investment, including China and the U.S., influences resource governance. Poor infrastructure and logistics hamper efficient resource extraction and export.
- **Regulatory and Transparency Gaps:** Despite improvements, weak governance structures allow corruption and illicit financial flows to

persist in the sector.

- **Community Displacement and Social Conflicts:** The exploitation of mineral resources has led to land rights disputes, inadequate compensation for displaced populations, and socio-political tensions.

6.4 DRC: DRC's Critical Minerals in the Global Energy Transition

The Democratic Republic of Congo (DRC) holds some of the world's richest reserves of cobalt, copper, coltan, and other critical minerals essential for the global energy transition. Despite this abundance, the mining sector's full potential remains unrealized due to pervasive corruption, opaque governance structures, and weak enforcement of regulations.

- **DRC's position in the Global Energy Transition:** The DRC contributes over 70% of global cobalt production, which is essential for lithium-ion batteries used in electric vehicles (EVs) and renewable energy storage. DRC's resources offer enormous opportunities for domestic value addition if effective policies are implemented.
- **Regulatory and institutional challenges:** Experts point to a fragmented oversight framework which undermines transparency and accountability in contract awards and revenue collection, hindering efforts to fully benefit from mining revenues and restricts attraction of responsible foreign investment.
- **Infrastructural Challenges:** Similar to Nigeria, the DRC's underdeveloped infrastructure, including unreliable power supply, insufficient transport networks, and limited processing facilities, restricts the country's ability to transform raw minerals into high-value products.
- **Environmental and Social Impacts:** Unregulated artisanal and small-scale mining practices have contributed to deforestation, water pollution, and land degradation in mineral-rich regions.
- **International Dynamics and Geopolitical Competition:** International interest in the DRC's minerals is high, especially from China, which dominates global supply chains for cobalt and other critical materials. However, this dependency also poses risks; fluctuations in demand or shifts in geopolitical relationships can impact pricing and market access. The DRC must carefully balance foreign investment with the development of domestic policies that safeguard its long-term interests.

6.6 Cross cutting trends in the four countries

The global transition to clean energy has intensified the demand for critical minerals, positioning resource-rich nations such as Nigeria, Ghana, Democratic Republic of Congo (DRC), and Mozambique at the center of this shift. These countries possess significant deposits of lithium, cobalt, graphite, and other essential minerals needed for electric vehicles and renewable energy technologies. However, despite their vast mineral wealth, governance challenges, infrastructure deficits, environmental concerns and over-reliance on foreign markets continue to hinder their ability to maximize the benefits of these resources. In particular, DRC stands out as the world's largest producer of cobalt, a critical input for battery technologies. However, the country faces acute governance and human rights issues, including child labor, unsafe working conditions in artisanal mines, and limited enforcement of environmental and labor regulations. These challenges have raised concerns among global buyers and have prompted calls for more transparent, ethical, and traceable supply chains. This analysis explores the key governance, economic, and environmental factors shaping the critical mineral sectors in these four nations and highlights the opportunities and challenges they face in leveraging their resources for sustainable development.

6.6.1 Governance and transparency deficits

Corruption remains a pervasive challenge in Nigeria, Ghana, DRC and Mozambique, particularly in the licensing of mining operations, resource allocation, and royalty collection. Weak institutional oversight and the presence of politically connected actors have allowed corrupt practices to thrive, diverting significant revenue away from national development. Political interference further exacerbates these challenges, distorting fair competition and creating barriers to private sector participation. The enforcement of transparency laws remains weak, leaving room for opaque dealings that undermine public trust in the governance of mineral resources. Additionally, the exclusion of local communities from decision-making processes has led to widespread discontent, as mining activities often proceed without adequately addressing the socio-economic needs of those directly affected. Strengthening governance frameworks, enforcing anti-corruption measures, and increasing public participation in resource

management are crucial steps toward improving transparency in the sector.

6.6.2 Dependence on foreign investment and markets

The economies of Nigeria, Ghana, DRC and Mozambique are heavily reliant on foreign markets for the export of critical minerals, with China playing a dominant role in purchasing and processing these resources. This reliance exposes these nations to fluctuations in global demand and shifts in foreign trade policies, leaving their economies vulnerable to external pressures. Mozambique's graphite sector has attracted substantial international investment, particularly from the U.S. and China, positioning it as a key supplier for battery-grade graphite. In contrast, Nigeria and Ghana have struggled to secure sustainable financing for their mining industries, largely due to governance concerns and perceived investment risks. While Ghana and Mozambique hold the potential for greater local beneficiation of minerals, a significant portion of their extracted resources continues to be exported in raw form. This limits their ability to maximize value from their natural wealth and highlights the need for stronger policies that encourage domestic processing and industrialization.

6.6.3 Environmental and social impacts

The unregulated expansion of artisanal mining across Nigeria, Ghana, DRC and Mozambique has led to severe environmental degradation, including widespread deforestation, water contamination, and soil erosion. In many cases, informal mining operations lack proper environmental safeguards, contributing to pollution and biodiversity loss. The rapid growth of mining activities has also fueled land disputes and the displacement of communities, as weak land tenure systems fail to protect the rights of local populations. In many instances, compensation mechanisms for affected communities remain inadequate or nonexistent, further exacerbating tensions between mining companies and local stakeholders. Furthermore, the enforcement of environmental regulations remains inconsistent, allowing companies to operate without adhering to sustainability guidelines. Addressing these issues requires stronger regulatory enforcement; clearer land rights policies, and an inclusive approach that prioritizes community welfare alongside economic gains.

6.6.4 Infrastructure and value addition deficiencies

One of the major limitations facing Nigeria, Ghana, DRC and Mozambique in their mineral industries is the lack of infrastructure necessary to support efficient extraction, processing, and transportation. Inadequate road networks, unreliable energy supply, and limited access to modern mining technology reduce the efficiency and profitability of mining operations. The absence of local processing and value addition facilities further prevents these countries from fully capitalizing on their mineral wealth. Instead of developing domestic refining capabilities, most extracted minerals are exported in their raw state, leading to lost economic opportunities. Investing in energy infrastructure, transportation systems, and industrial processing plants is essential for enhancing competitiveness in global mineral supply chains and ensuring that resource-rich nations derive maximum economic benefits from their natural endowments.

6.6.5 The strategic importance of critical minerals in the energy transition

With the global shift toward renewable energy and electric mobility, Nigeria, Ghana, DRC and Mozambique have a unique opportunity to position themselves as key suppliers of critical minerals. Lithium deposits in Nigeria and Ghana, along with Mozambique's vast graphite reserves, and DRC's Cobalt and Copper, are essential components in battery technologies for electric vehicles and energy storage systems. As demand for these materials grows, these countries have the potential to integrate more deeply into global clean energy supply chains. Additionally, the African Continental Free Trade Area (AfCFTA) offers a strategic avenue for regional collaboration in mineral beneficiation, allowing African nations to collectively enhance their processing capabilities and reduce dependence on external markets. To fully capitalize on this opportunity, national policies should prioritize research and development in mineral processing, foster partnerships with clean energy industries, and create incentives for local investment in critical mineral refining.

7.0 Leveraging open data and civic technology in Nigeria, Ghana, DRC and Mozambique's critical mineral sector



The role of open data and civic technology in enhancing governance, transparency, and accountability within the extractive industries cannot be overstated. In Nigeria, Ghana, DRC and Mozambique, critical minerals are central to the energy transition, yet their governance is often marred by corruption, opacity, and weak regulatory enforcement. By leveraging digital tools and data-driven approaches, these countries can improve transparency in resource management, curb illicit financial flows, and ensure more equitable distribution of benefits from mineral wealth.

7.1 Nigeria: Using technology to enhance transparency in the mining sector

Nigeria's critical mineral sector, particularly lithium mining, has been plagued by corruption, smuggling, and regulatory inefficiencies. One of the primary challenges is the lack of reliable and accessible geological data, which deters investment and enables illicit activities. Open data initiatives such as the Nigerian Mining Cadastre Office's digital cadastre system have improved licensing transparency but remain limited due to political interference and weak enforcement.

To address these issues, Nigeria can implement blockchain technology for tracking mineral exports, ensuring that transactions are publicly verifiable and immutable. Additionally, AI-powered satellite monitoring can be used to detect illegal mining activities in lithium-rich areas such as Nasarawa and Kogi states. Civic technology platforms that allow citizens to report illegal mining activities through mobile applications or SMS-based systems can also enhance community participation in monitoring the sector.

Moreover, integrating Nigeria's extractive industry data with global transparency platforms like the Extractive Industries Transparency Initiative (EITI) can strengthen accountability. Providing real-time production and

revenue data would reduce opportunities for tax evasion and smuggling, ensuring that mining revenues contribute to national development rather than illicit networks.

7.2 Ghana: Advancing civic engagement through open data

Ghana's mining sector, particularly its manganese and lithium industries, has faced persistent governance challenges, including political patronage in licensing, revenue mismanagement, and limited public access to mining contracts. The lack of easily accessible data on mining revenues and contract agreements has fostered an environment where corruption thrives.

An effective strategy for Ghana would be the establishment of a centralized online portal where all mining contracts, royalties, and production figures are made publicly available in an interactive format. This platform should be integrated with the EITI framework, allowing civil society organizations and journalists to scrutinize financial flows and detect irregularities.

Furthermore, leveraging civic technology for participatory governance can ensure that affected communities have a voice in decision-making. Mobile-friendly reporting tools can enable local communities to document environmental violations, land disputes, or unfulfilled corporate social responsibility (CSR) commitments. These tools, combined with geospatial mapping of mining concessions, would provide an evidence-based approach to holding mining companies and regulators accountable. Ghana can mitigate corruption risks and create a more equitable and sustainable mining industry by institutionalizing open data policies and mandating digital transparency in licensing and revenue collection.

7.3 Mozambique: Securing resource governance through digital oversight

Mozambique is a key supplier of graphite, a critical mineral essential for lithium-ion battery anodes. However, its extractive sector is vulnerable to illicit financial flows, armed insurgencies in mining regions, and weak

governmental oversight. The Balama Graphite Operation, one of the world's largest graphite mines, highlights the need for enhanced transparency in contract management, revenue reporting, and environmental compliance.

To improve governance, Mozambique can adopt open contract databases that detail agreements between the government and mining companies, ensuring that royalties and tax obligations are publicly monitored. Additionally, developing an open-access supply chain tracking system using blockchain technology would help curb mineral smuggling and underreporting.

Furthermore, mobile applications that enable real-time reporting of human rights violations or environmental degradation can empower local communities and watchdog organizations. Given the security risks in Cabo Delgado, deploying digital forensic tools for tracking financial transactions linked to illicit mining can also help disrupt illegal networks financing insurgencies.

7.4 DRC: Leveraging civic technology for anti-corruption

The governance of DRC's mining sector remains weak, plagued by secrecy, limited oversight, and corruption. To address these issues, the DRC can leverage open data systems and civic technology to promote transparency and ensure a more equitable distribution of mineral wealth.

In the DRC, many mining contracts and revenue flows remain shrouded in secrecy, hampering efforts to track the true value of resource extraction. One key reform would be the strengthening of a centralized, digital platform for mining-related data, including contracts, licenses, royalties, and environmental assessments. Such a system would enable real-time monitoring by both government agencies and civil society. This would reduce opportunities for corruption, increase accountability, and allow for better tracking of revenue flows and environmental compliance.

In addition to digital transparency, the DRC can harness emerging technologies such as blockchain for securing supply chain transactions, creating a tamper-proof record of mineral exports, thus minimizing revenue

leakages and illicit activities. Satellite imagery can also be deployed for real-time surveillance of mining sites. These tools, along with mobile and SMS-based reporting platforms, would empower local communities and watchdogs to report illegal activities and enforce compliance.

7.5 A path forward for open data and civic technology

Nigeria, Ghana, DRC and Mozambique have significant opportunities to enhance governance in their critical mineral sectors by leveraging open data and civic technology. Implementing blockchain for supply chain transparency, utilizing AI and satellite imagery for illegal mining detection, and fostering digital civic engagement can transform the mining industry into a more accountable and inclusive sector. These countries can embrace these innovations to secure their place in the global energy transition while ensuring that mineral wealth benefits their economies and communities.

8.0 Summary of policy recommendations



This study highlights the importance of critical minerals in the global energy transition and outlines policy recommendations to improve governance, sustainability, and economic development in the mining sector. These recommendations focus on strengthening governance, mitigating corruption, promoting environmental sustainability, and enhancing economic value addition.

To strengthen governance and institutional frameworks, an independent mining regulatory commission should be established in each country, free from political influence. This body should ensure transparency in its recruitment processes and decision-making operations. For countries like DRC, where artisanal and small-scale mining (ASM) plays a major role in cobalt production, there is a critical need to formalize and regulate this subsector. This includes providing miners with identification cards, training, and safer working environments. Inter-agency collaboration must also be enhanced by developing a centralized database that tracks mining operations and facilitates information sharing among key institutions, such as the Ministry of Mines and Steel Development, NEITI and security organizations in Nigeria, and the Ministry of Mines and GECAMINES in DRC. Transparency in mining licensing should be improved by implementing

open-access digital cadastre systems that provide real-time public disclosure of applications, approvals, and rejections to prevent politically motivated decisions.

To combat corruption, DRC should strengthen transparency and oversight mechanisms for the artisanal cobalt supply chain, including full traceability of cobalt exports, and partnerships with international buyers to enforce responsible sourcing standards. In Nigeria and other African countries, anti-corruption bodies such as the EFCC and ICPC should be empowered to investigate and prosecute cases of corruption in the mining sector. A robust whistleblower protection system must be established to encourage reporting of illicit activities. Strict penalties should be enforced for illegal mining and smuggling, including revoking licenses and imposing higher fines on violators. Advanced technologies such as AI-powered monitoring systems, drones, and satellite imagery should be used to track illicit activities across mining regions. The adoption of the Open Contracting Data Standard (OCDS) for all mining agreements and the establishment of independent audit committees will help ensure transparency in contracts and revenue management.

In all countries, including DRC, which faces significant environmental degradation linked to artisanal mining, environmental sustainability must be prioritized. National mining authorities should enforce strict compliance with environmental regulations, especially on rehabilitation and waste disposal. Companies that fail to adopt sustainable practices must be penalized. Responsible mining should be encouraged through incentives for eco-friendly operations, and a “Green Mining Certification” system should be introduced. Environmental Restoration Funds financed by mining companies should support land reclamation efforts. Additionally, post-mining rehabilitation must be a binding condition for obtaining or renewing licenses. In DRC, community-level environmental monitoring and the integration of women and youth in environmental protection programs can help improve local participation and outcomes.

To enhance economic development and value addition, countries must develop local critical mineral processing industries. In DRC, for example,

building domestic capacity to process cobalt and battery-grade materials would reduce dependency on foreign processors and increase national revenue. Tax incentives should be provided to companies investing in domestic refining and processing, and public-private partnerships should be encouraged for developing refining infrastructure for lithium, graphite, and rare earth elements. Investments in transport and energy infrastructure are crucial to support the mining value chain, especially in remote regions of DRC and Mozambique. Industrial clusters should be created to facilitate mineral beneficiation and downstream manufacturing. In line with global best practices, royalty rates should be revised to reflect international market prices, and resource-backed investment models (as seen in Chile's lithium strategy) should be considered.

Effective implementation of these recommendations requires a multi-stakeholder approach that brings together governments, private sector actors, civil society organizations, and local communities. In DRC, this includes supporting community development agreements that ensure mining revenues benefit host communities directly. The use of digital solutions such as blockchain should be encouraged to track mineral flows and prevent smuggling. AI-driven satellite surveillance should be used to detect illegal mining activities in real time. Finally, institutional capacity-building is essential. This includes strengthening the technical expertise of enforcement agencies and providing training and equipment for small-scale and artisanal miners to improve safety, compliance, and productivity.

9.0 Final Conclusions



This study concludes that while African countries are endowed with abundant natural resources, they have yet to convert this wealth into broad-based, inclusive economic development. The experience across Nigeria, Ghana, Mozambique, and the Democratic Republic of Congo (DRC) underscores a persistent pattern: resource exploitation has often enriched multinational corporations and political elites, while leaving local communities in poverty and ecosystems severely damaged. Previous extractive industries, such as oil, gas and coal, have not delivered the transformative economic impact envisioned, largely due to governance failures, corruption, and weak institutional capacity. These recurring

challenges have contributed to social unrest, environmental degradation, and deepening inequality, perpetuating a cycle of missed opportunities.

A central finding of this study is the inequitable nature of extractive contracts and licensing regimes. In Mozambique, gas deals with companies like SASOL offered tax exemptions that undermined national revenue gains. In DRC, cobalt extraction (a mineral essential to the global energy transition) has been plagued by informality, weak oversight, and hazardous working conditions, particularly for artisanal and small-scale miners. Despite contributing a substantial share of the world's cobalt, DRC has limited influence over the value chain, with most processing occurring abroad. These conditions not only limit domestic value retention but also expose Congolese miners to exploitation and health risks, further marginalizing vulnerable populations.

The DRC example also illustrates the complexity of achieving good governance in a politically volatile and resource-dependent context. Decades of instability, coupled with institutional weakness, have enabled opaque deals, environmental violations, and an unchecked artisanal mining sector to flourish. Community dissatisfaction has escalated in mining regions, with protests and labor abuses reflecting the absence of equitable benefit-sharing mechanisms. The findings stress that without serious reforms, African countries risk perpetuating the “resource curse,” where mineral wealth fuels corruption, foreign dependency, and social instability.

This study calls for robust institutional frameworks to ensure that mineral wealth benefits the broader population. Transparent contract negotiations, parliamentary oversight, and full revenue disclosure are necessary to build public trust and reduce elite capture. In DRC, as in the other case study countries, building national capacity for contract enforcement, fiscal auditing, and environmental regulation must be prioritized. The establishment of independent, non-political mining commissions, along with the digitization of license records and revenue tracking systems, would significantly improve accountability.

Equally important is the need to promote local economic development

through industrial policy. Instead of continuing a model based on raw mineral exportation, African countries must focus on value addition and the development of domestic processing industries. In DRC, there is a growing recognition of the need to establish battery precursor facilities to retain more value from its cobalt exports. Similar strategies should be pursued across the continent, with policy incentives that encourage foreign firms to invest in local refining, fabrication, and assembly of green technologies.

Community participation must also be placed at the heart of mining governance. As shown in DRC and other countries, exclusion of local populations from decision-making processes undermines the legitimacy and sustainability of mining operations. Implementing legally binding community development agreements, fair revenue-sharing models, and participatory monitoring systems can help align national interests with local needs and reduce tensions in mining zones.

Finally, environmental sustainability must no longer be an afterthought. Across all four countries, mining has left behind degraded land, polluted water sources, and weakened ecosystems. The enforcement of environmental regulations, rehabilitation obligations, and corporate accountability must be strengthened. In DRC, specific attention should be given to the environmental and human health risks posed by artisanal mining, including exposure to toxic substances and the destruction of agricultural land. Countries must also explore integrating mining reforms with broader climate and energy strategies, investing in renewable energy technologies and carbon mitigation solutions alongside mineral development.

In conclusion, to break the cycle of extractive-driven underdevelopment, African countries must adopt a new model of inclusive, transparent, and sustainable resource governance. This includes strengthening institutional capacity, promoting value addition, ensuring equitable revenue distribution, enforcing environmental safeguards, and centering the rights and voices of mining-affected communities. Only through such comprehensive reforms can the continent's critical mineral wealth serve as a catalyst for long-term development and social progress.

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