The Future of the Mining Industry in Ghana

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Graphical Abstract

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1 Background and Context

Mining is a crucial economic sector in Ghana. The sector contributes significantly to Ghana's GDP, attracts foreign direct investments and provides a major source of export revenue, primarily through gold, and is a key employer and major contributor to government revenue through taxes and royalties.
Even though mining contributes significantly to the Ghanaian economy, it also faces major challenges related to environmental damage, social impacts and managing the revenues effectively. This editorial explores the future of the mining sector in Ghana in the light of these challenges, particularly from the perspectives of sustainability and climate change mitigation.

2 The Ghanaian Mining Industry

2.1 Ghana's Mineral Resources

Ghana is endowed with vast mineral resources including gold, bauxite, manganese and diamond. Gold is the most prominent mineral resource produced in the country, accounting for over 90% of all mineral revenue over the past three decades. Ghana is also one of the largest producers of manganese, while there is significant production of diamond which, even though not as prominent as gold mining, contributes to the country's mineral wealth and export revenue.
The country is also endowed with unexploited deposits of iron ore, limestone, brown clay, kaolin, mica, columbite–tantalite, feldspar, silica sand, quartz, salt and others. There are also minor deposits of ilmenite, magnetite and rutile. Some of these industrial minerals,

such as brown clay, kaolin and silica sand, are being exploited on small scale to supply local industries in ceramics, paint and glass manufacturing, respectively. There is also huge potential in solar salt production, but this remains to be fully realized.
Cumulatively, these mineral resources and deposits have contributed significantly to the Ghanaian economy by providing export revenue, creating employment opportunities, supporting the development of the construction and manufacturing industry, and enabling general infrastructural development.

2.2 Legal, Policy, Governance and Management Structure of the Industry

The core policy framework that guides the operations and management of the Ghanaian mining industry is enshrined in the *Minerals and Mining Policy of the Republic of Ghana* (November 2014). Its basic thematic focus is *Ensuring Mining Contributes to Sustainable Development*.
The policy document was developed having regard to the provisions of the 1992 Constitution of the Republic of Ghana (as amended in 1996) and with a view to complementing the Ghana Growth and Poverty Reduction Strategy (GPRS II), the Draft Medium Term Development Plan and the Better Ghana Agenda, which set out measures and initiatives for economic growth and improvement in the standard and quality of life of all Ghanaians. Other documents taken into account include guidelines and policies prepared under the Natural Resources and Environmental Governance (NREG) Programme which relate to social and environmental issues and sustainability of mining communities after mine closure.
The legal framework of the Ghanaian mining industry is a multi-layered structure comprising the national Constitution, primary legislation, subsidiary regulations and institutional oversight. The core principle is that all mineral resources are vested in the President on behalf of the people of Ghana.
The core legal framework for the industry includes the Minerals and Mining Act, 2006 (Act 703), as amended by the Minerals and Mining Act, 2015 (Act 900), and as further amended by the Minerals and Mining Act, 2019 (Act 995). These Minerals Acts consolidate all the laws related to mineral rights, ownership, environmental protection and small-scale mining. The amended Act of 2015 introduced stricter penalties, particularly targeting illegal mining activities ("galamsey") and the involvement of foreigners in small-scale mining operations.

Other key legislations regulating mining in Ghana are:

- the Minerals Commission Act, 1993 (Act 450), which established the Minerals Commission as the main regulatory body responsible for managing and regulating the utilization of mineral resources; and
- the Ghana Gold Board Act, 2025 (Act 1140), which established the Gold Board as the sole authority to regulate, buy, sell and export gold and other precious minerals produced by artisanal and small-scale miners in Ghana. The Act, assented to by the President in April 2025, aims to formalize the industry, increase transparency, boost national revenue and gold reserves, and combat smuggling.

Other substantive enactments that regulate mining in Ghana include:

- the Minerals Development Fund Act, 2016 (Act 912);

- the Minerals Income Investment Fund Act, 2018 (Act 978), as amended by the Minerals Income Investment Fund (Amendment) Act, 2020 (Act 1024); and
- the Kimberley Process Certificate Act, 2003 (Act 652).

Apart from these key legislations, there are also a number of legislative instruments (LIs) that provide rules and procedures for the mining industry, including:

- Minerals and Mining (General) Regulations, 2012 (L.I. 2173): prescribes guidelines for the disposal of minerals, local content requirements and general operational procedures.
- Minerals and Mining (Health, Safety and Technical) Regulations, 2012 (L.I. 2182): focuses on mine safety, operating plans, inspections and specific facility requirements (e.g., processing plants, electrical systems).
- Minerals and Mining (Support Services) Regulations, 2012 (L.I. 2174): regulates support services within the industry.
- Minerals and Mining (Compensation and Settlement) Regulations, 2012 (L.I. 2175): provides a framework for compensating landowners and communities affected by mining activities.

Aside from the Minerals Commission, which is the principal regulatory body overseeing the administration of mining laws and granting licenses, other key institutions involved in the management of the mining sector are the Ministry of Lands and Natural Resources, the sector ministry with overall policy and oversight responsibility, and the Environmental Protection Agency (EPA), responsible for environmental permitting, monitoring and enforcing environmental standards in the mining sector.

2.3 Challenges of the Mining Industry

Despite the robust and encompassing regulations that govern the mining industry in Ghana, the sector faces significant challenges spanning environmental, health, socio-economic and governance issues. These challenges are largely driven by widespread illegal artisanal small-scale mining (known locally as "galamsey") and, to a lesser extent, the operations of larger companies.

The environmental challenges of the mining industry include water pollution, deforestation and land degradation, soil contamination and physical hazards. Water pollution is caused by the use of toxic chemicals like mercury and cyanide, which directly contaminate major water bodies and groundwater sources. Deforestation and land degradation result from extensive clearing of forests and destruction of fertile agricultural land for mining activities, sometimes leading to rapid land degradation and habitat destruction for diverse species.

Soil contamination is caused by the leaching of toxic substances, leading to high levels of heavy metal (e.g., mercury, arsenic) contamination that can enter the food chain, jeopardizing food safety. Physical hazards are caused by open pits and unstable mounds of soil left behind after mining, which pose physical dangers to communities and can become breeding grounds for mosquitoes, increasing the risks of diseases like malaria.

Health and safety challenges of mining include occupational hazards, chemical exposure and community health risks. Miners are exposed to occupational hazards due to severe health and safety risks, including dust inhalation, extreme heat, heavy machinery accidents and the danger of tunnel collapses in unregulated underground operations. Chem-

ical exposure, especially direct exposure to mercury vapour during gold extraction, has been identified as a major cause of kidney disorders and other serious health problems among miners.

Miners and communities also face health risks due to contaminated water sources, leading to increased incidences of waterborne diseases like typhoid and various skin infections. There are also concerns about a rise in unexplained cancers and birth defects in mining areas.

Socio-economic and governance challenges in mining include the scourge of illegal mining, which is primarily driven by poverty and unemployment and undermines legitimate operations, making regulation difficult. Illegal mining is also a primary driver of many environmental and social ills. Other governance challenges include social disruption and conflicts, which can lead to displacement of communities, social problems such as drug abuse and prostitution, and conflicts over land and resources, including smuggling of illegally mined gold and potential losses of tax revenue.

3 Environmental Sustainability and Climate Change Mitigation

Environmental sustainability is one of the three core pillars of overall sustainability, which must be balanced for true sustainable development. It involves maintaining an ecological balance in natural environments and conserving natural resources like clean air, water and wildlife for the long term.

Some key relevant principles of environmental sustainability in the mining sector in Ghana are the principles of pollution prevention and resource efficiency. Pollution prevention involves measures to reduce waste, emissions and the use of harmful chemicals to protect air, water and soil quality. Resource efficiency involves minimizing the consumption of finite resources and raw materials.

Climate change mitigation refers to actions or interventions designed to reduce or prevent the emission of greenhouse gases (GHGs) into the atmosphere and enhance their removal by natural or artificial "sinks". The primary goal of mitigation actions is to stabilize atmospheric GHG levels and limit global warming and the most severe impacts of climate change, as outlined in the Paris Agreement. A key climate mitigation strategy relevant to the mining sector in Ghana is the enhancement of carbon sinks, which involves protecting and restoring natural ecosystems that absorb carbon dioxide from the atmosphere, such as forests, wetlands and oceans. The mitigation strategy recommends actions such as halting deforestation, reafforestation and regenerative agricultural practices that improve soil health.

Ghana is significantly affected by climate change, particularly in aspects of the country's economic and human development. Key sectors impacted by climate change include agriculture, energy, water resources and human health. Ghana is also a signatory to the Paris Agreement, and the country's mitigation strategy, as outlined in its Nationally Determined Contributions (NDC) under the Paris Agreement and the Environmental Impact Act of 2025, focuses on achieving a 15% unconditional reduction in GHG emissions relative to a business-as-usual scenario by 2030, with an additional 30% reduction conditional on international support.

A major priority sector for achieving Ghana's mitigation strategic goals in the Forest and Agriculture (AFOLU) sector is the implementation of the National Forest Plantation

Development Programme to restore degraded forest lands and increase carbon sinks. Mining is a major sector that has contributed significantly to land degradation in Ghana. Thus, environmental sustainability and implementation of climate mitigation strategies in mining are of paramount importance to Ghana in addressing issues like deforestation, water pollution and soil degradation. This can be accomplished through stringent regulations, responsible practices and collaborative efforts to mitigate the adverse environmental impacts associated with mining activities, thereby ensuring long-term sustainability of the sector.

4 Future Outlook of Mining in Ghana

Mining is a key economic sector in Ghana, providing much-needed revenues to finance the economic and infrastructural development of the country and contributing significantly to the country's gross domestic product (GDP) through foreign exchange earnings and investments. The sector has also played a crucial role in employment generation, reducing poverty and improving livelihoods in mining communities.

However, there is an urgent need to address the environmental and social challenges affecting the sector to enhance its sustainability and contribution to meeting the climate change objectives of the country. Enforcing key environmental and mining policies can enhance the ability of the country to ensure the continued positive impacts of mining on its economy while mitigating the negative consequences.

If these measures are effectively implemented, they will help secure a mining sector that contributes to sustainable economic development, social well-being and environmental stewardship in Ghana. The future of the mining industry will therefore depend on how well the country balances extraction with restoration, growth with equity and short-term gains with long-term resilience.