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Impacts Of Surface Mining on Guineas' Industrial Development

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Abstract: Guinea is a country located in the western part of Africa, richly endowed with abundant natural resources. The mining of bauxite alone contributes to about 85% of Guinea's exports and approximately 20% of its GDP. This study aims to identify the impacts of surface mining on Guinea's industrial development. The findings reveal that surface mining has positive effects, such as boosting the economy, developing infrastructure, generating employment opportunities, improving basic social amenities, providing education and training for locals working in the mines, and developing small and medium-scale enterprises in Guinea. However, surface mining has also had adverse impacts on the environment and local communities. For example, mining activities have been linked to water pollution, soil degradation, and deforestation, which can have long-term effects on the health and well-being of affected communities. Therefore, it is crucial to strike a balance between the economic benefits of mining and the need to protect the environment and communities living around the mining areas. The government and mining companies must collaborate to ensure that mining activities are conducted responsibly and sustainably, and the benefits of mining are equitably shared among all stakeholders.

Key words: Bauxite, Environmental impact assessment, Environmental regulation, Guinea, Industrial Development, Natural resources, The Environmental Management Plan.

1 INTRODUCTION

Guinea, a country located in western part of Africa is bordered by Guinea Bissau to the Northwest, Senegal to the North, Mali, to the Northeast, and Sierra Leone, Liberia, Côte d'Ivoire to the South, and Atlantic ocean to the West. Guinea enjoys sizeable endowments of natural resources, energy opportunities, and arable land. the country's population was 13.49 million and an area of 245,857 square kilometers (94,926 sq mi)[1].

The gross domestic product (GDP) of Guinea has increased significantly since 1990, reaching a new high of $24.47 billion in 2017. The service sector accounts for 42% of GDP, while industry accounts for 38.4% and agriculture accounts for 19.5% [2].

Guinea is equivalent to 8% of the world's average.

Fig.1(a)Guinea's Location, 1(b) Flag of Guinea, 1(c)Map of Guinea (Source: google.com)

West African industry and commercial farming continue to focus on exporting primary goods, which has led to the growth of industrialization and plantation farming. Therefore, the economy of Guinea, which is heavily reliant on the export of bauxite, gold, and diamonds, needs to diversify immediately [3].

The country has the world's largest bauxite reserves and ranks sixth in the extraction of high-grade bauxite, or aluminum ore. It also accounts for 94% of Africa's mining production of bauxite and its large mineral reserve is of immense interest for international firms. In the past few years, the mining industry has been in the middle of a lot of trouble due to iron ore mining and the block of mines in Northern Guinea. The mining industry of Guinea was developed during colonial rule and is responsible for 17% of Guinea's GDP and 50% of its exports [4].

Guinea is one of the few countries to try a development program without assistance from its former colonial power, rejecting General de Gaulle's offer of autonomy in 1958 and becoming a republic. Guinea bauxite reserves are located in the Fria region, making it an important economic player. This sector's contributions have been crucial to the country's economic growth, with 87% of exports coming from agricultural products in I958, but by I967, that figure had dropped to around 50%. The Fria, Boke, Kindia, Dabola, and Los Islands have sizable bauxite deposits, and Kassa began mining operations in 1952 [5].

Fig.2(a) Mining Site, 2(b) Guinea Bauxite Factory, 2(c) Operation Time, (d) Africa Top Bauxite Exporter (Source: googlescholar.com)

Guinea is endowed with abundant natural resources including but not limited to large deposit of bauxite reserves, substantial gold, diamond, and a wealth of other minerals and metals. Guinea overtook Australia as the world's largest bauxite exporter in 2019, with 23% of the global total. The Mining industry is the most promising industry, with tens of foreign companies engaged in the production and export of bauxite, iron ore, gold, and diamonds.

Compagnie des Bauxites de Guinee (CBG) is a partnership between the Guinean government, Alcoa, Rio Tinto, and Dalco Investments. Société Meniere de Boke (SMB). Recently, a Sino-Singaporean conglomerate, has recently surpassed CBG as the largest single producer of bauxite, despite Guinea's large reserves.

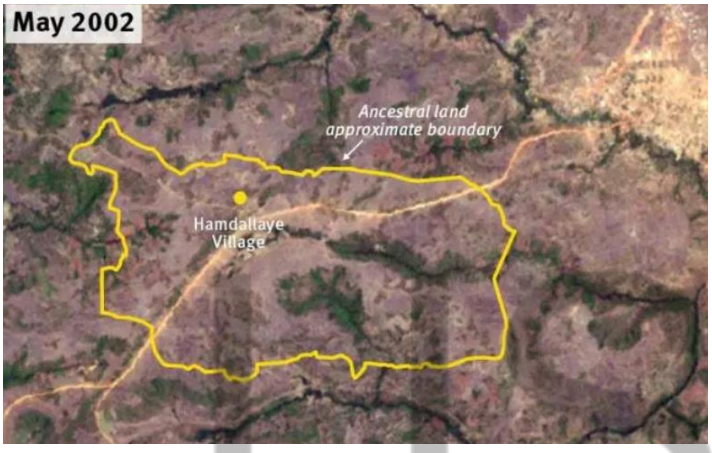
New companies are opening concessions and expanding operations to meet the rising demand, and the building of roads and railroads is a future market that has the potential to be profitable due to its connection to the prosperity of mining developments.

To facilitate the export of iron ore from Simandou and Mount Nimba, the Trans Guinean Company will oversee the construction of a rail network across Guinea and a new deep-water port beginning in 2022. It is planned to ship Nimba's resources via a rail line to the Liberian port of Buchanan [5].

Fig.3(a) Women at mining, 3(b) Young people at mine (Source: googlescholar.com)

The alumina percentage in the Sangarédi bauxite's deposit is 50%, and CBG has mining rights until 2038. In 2014, CBG shipped out 15.24 million tonnes of high-quality bauxite. To increase output, the company plans to invest $1 billion to expand the Kamsar port and resettle the

nearby communities of Hamdallaye and Fassaly Foutahbe [6].



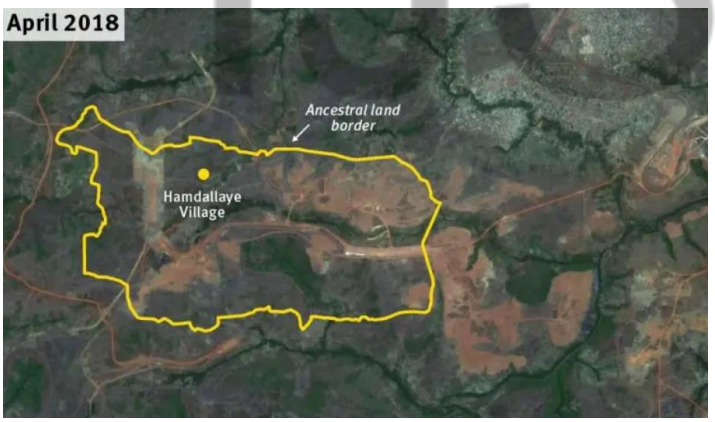


Fig.4(a) Bauxite Loading Area, 4(b) Site Before-Extraction, 4(c) Site After-Extraction, 4(d) Bauxite Train loading, 4(e) Bauxite Operation Time. (Source: googlescholar.com)

Problems

Currently, global mining industries are trying to address the issues of environmental, social, and governance (ESG) challenges facing the mining sector. Geopolitics has become increasingly important due to global conflict and resource nationalism, whereas the mining industry has committed to achieving net-zero emissions. Also, the effect of covid 19 outbreak in early 2020 has disrupted the supply chain for the first time, and miners are under pressure to supply the global demand for solid minerals [7].

Mining activities such as prospecting, exploration, construction, operation, maintenance, expansion, abandonment, decommissioning, and repurposing can lead to environmental problems such as deforestation, erosion, contamination of soil profiles, local streams and wetlands, and increase noise and air pollution [8].logistical challenges of getting the ore to the ports mean that vast quantities of high-quality iron ore are still sitting untapped.

Mining activities in Guinea did not only affect the environment but also the wellbeing of people living within the vicinity of a mine. The effects ranges from respiratory diseases, lack of hygiene and spread of communicable diseases such as malaria.

Mining also causes denaturation of soil qualities, destruction of farmlands, and contamination of acid drainage from runoff which significantly hinders the farming activities.

The aim of this study is to identify and discuss the impacts of Surface Mining on Guineas' industrial development. Reviewed literature is used to identify the direct and indirect impacts of surface mining in Guinea. The identified impacts are interlinked with Guinea's industrial development.

2 Literature Review

Several resource-rich countries in Africa and South America uses mining industries to enhance their economy.

The Guinean economy relies heavily on mining as it accounts for about 26% of national GDP and provides 85% of export revenues[9].The development of mining sector shows significant increase in exports from

34% in 2005 to 41% in 2009. Following the global demand for bauxite, diamonds and gold, and the need to diversify the rest of the Guinean economy, the country witnessed a significant amount of FDI inflow into the alumina and iron production sectors in 2011 that is equivalent to the Guinea's GDP. The FDI transforms Guinea's macroeconomic policies in trade and helps in avoiding inflationary cost of these investments [10], [11].

According to Bel Air's findings, mining project decision making, and management will expand to include the whole spectrum of activities. In the long term, this is beneficial for the nation. Alternatively, this method may be used to lessen the project's potential dangers, Impacts on society and the environment throughout all phases of a project's development, from conception to final dismantling.[12]

According to Sengupta 1993, some negative effects of mining include waste management, air pollution, waste disposal, pollution of soil and water (surface and groundwater). Also, natural environments have been damaged, farm and forest land has been lost, sediment has built up, and some species have gone extinct because of mining [13].

Most surface mining activities are done on a large scale, so a lot of material, including overburden, must be removed before the mineral deposit can be taken out and the procedure may generate a substantial quantity of trash. Therefore, it is essential to note that this process may contaminate the air, scar the environment, or create noise disturbances [14].

Surface mining techniques such as strip mining, open pit mining, opencast mining, and quarrying begin at or near the surface and maintain this exposure while the miners work to remove the desired resource. These mining activities has far-reaching effects on soil, fauna, vegetation, and surface water, and can have an impact on groundwater close to the surface if it is carried down further below the water table [14].

Extensive use of water in the mining and processing industries, significantly altered the hydrology of the area, and in many instances the negatively impacted the water quality of the whole area [15].

James Wormington has said that if bauxite mining isn't managed well, it could hurt the way of life and way of making a living in many villages that are close to where mining is done [16]

2.1 Impacts of Mining in Guinea

Guineas' mining revenues making up almost 20% of gross domestic product and almost 90% of its exports in 2014 [17]. The mining sector in Guinea is a major contributor to the country's economy. CBG is the biggest private sector firm in Guinea and the government's primary source of income, with a successful track record [18].

Mining in Guinea has a divergent effect on multiple sectors such as people's livelihood through destruction of homes and farmlands, water scarcity, air pollution, and human health. It also causes communal disputes and affects the protection of Customary Land Rights, exerting pressure on surviving land, and dispossession of land in Guinea [19].

Dust from bauxite mining can make the air quality bad, which can be bad for people's health and water supplies. Community health professionals in Guinea have reported that mining companies have withheld information about the effects of mining activities on nearby communities [20].

3 RESULTS

Mining has both positive and negative impacts on individuals and communities in Guinea. Some of the impacts include but not limited to environmental impacts, conflicts over land use, public health, and safety. Similarly, mining can boost local economies and create new jobs, and introduction of sustainable mining activities and procedures such as water purification and ecological restoration can have a beneficial impact on environmental systems [21].

The study classified the impacts into positive and negative impacts.

3.1 Analysis of Positives and Negatives Impacts

The positive impacts include boosting of the economy, development of infrastructure, employment generation, improvement of basic social amenities, education and training for locals working in the mines, and development of small and medium scale enterprises in Guinea.

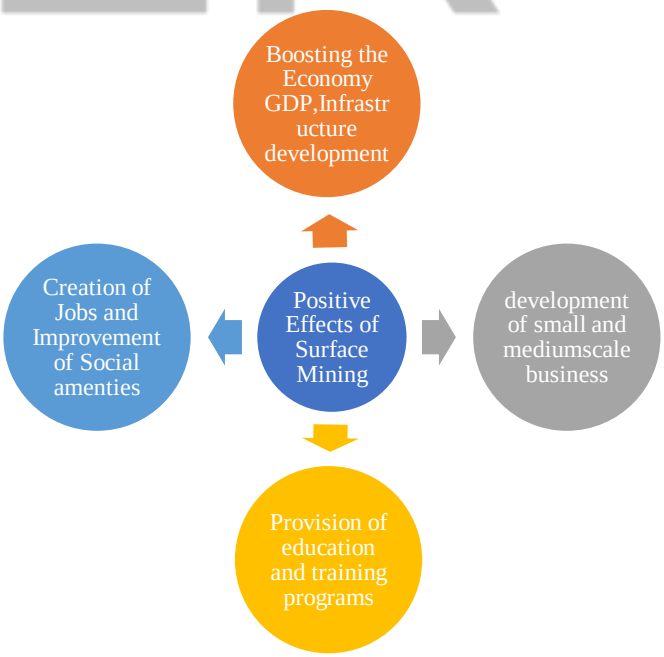


Chart .1Positive effects of mining (Source: Authors)

***3.1.1 Economic growth*:** The mining industry significantly enhances the economic growth in Guinea. According to the World Bank, mining accounted for about 80% of Guinea's exports and 20% of the country's GDP in 2019[22].

***3.1.2 Revenue generation*:** Mining activities generates revenue for the government through taxes, royalties, and other fees. In 2018, Guinea's mining sector contributed about $1.3 billion in revenues to the government [22].

***3.1.3 Technology transfer*:** When new mining methods and technologies are used, they can help local people learn new skills and gain more knowledge. This can lead to a more skilled workforce. For example, the Compagnie des Bauxites de Guinea (CBG), a large bauxite mining company in Guinea, has set up training programs for local workers to help them learn about modern mining techniques and improve their skills [23].

***3.1.4 Access to services*:** mining companies may provide services such as health care, education, and access to clean water and sanitation facilities, which can benefit local communities. For example, the Guinea Alumina Corporation, a bauxite mining company, has provided health care services and clean water access to local communities in Guinea [24].

***3.1.5 Community development*:** Mining companies can help with projects like building schools, issuing scholarships, and improving infrastructure through their corporate social responsibility programs. For example, the Société Minière de Boké (SMB), a company that mines bauxite, has worked with local communities in Guinea to build schools and health clinics as part of community development programs [25].

3.2 Analysis of Positives and Negatives Impacts

The negative impacts of surface mining include water, air and noise pollution, soil erosion, toxic wastes, deforestation, destruction of biodiversity, conversion of vegetal cover, land disputes, loss of farmland, destruction of homes, and dispossession of land.

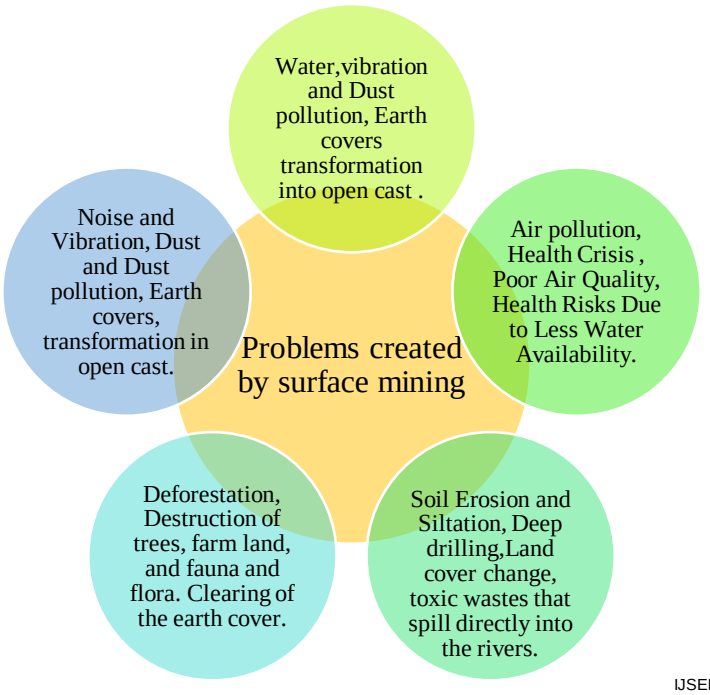


Chart .2 Negative effects of mining (Source: Authors)

***3.2.1 Loss of Land and Livelihoods*:** Farmers in villages surrounding mining areas reported that mining companies had taken their land and property without adequate compensation or in exchange for compensation that did not reflect the true value of their losses [10].

***3.2.3 Reduced Access to Water*:** Research has shown that bauxite mining could have a big effect on the water cycle in the area. This could change the amount and quality of water that people in the area have access to. As a result, many locals are concerned about access to clean drinking water, with some relying on the mining company to provide water in tankers, which may not always be clean [4].

***3.2.4 Threats to Health from Reduce Air Quality*:** Human Rights Watch has talked to doctors and nurses who are worried about how mining might increase the cases of respiratory diseases in the area. Even though this is not confirmed, evidence shows that mining activities affect the air quality of the communities surrounding the mines. The Guinean government takes only a few air quality readings per year, but the data suggests a moderate risk to public health, especially in SMB's concession. There is a need for improved monitoring by mining companies and the government [26].

***3.2.5 Transparency Issues in the Mining Sector*:** Mining activists and community leaders have accused the mining industry for not transparent enough, especially when it comes to access to important documents like environmental and social impact assessments (ESIAs), environmental and social management plans (ESMPs), government and company inspection reports, audits, and monitoring data [27].

***3.2.6 Lack of Accountability*:** A big problem is that mining companies whose actions hurt the rights of local people don't have to pay for it. Companies that repeatedly break social and environmental rules have been shut down or fined by the government [28].

4 Discussions

Surface mining has had significant impacts on Guinea's industrial development. Positively, mining activities have contributed to the country's economic growth, create employment, and generate revenue for the government. Guinea is one of the largest exporters of bauxite in the world, and bauxite mining has been a key driver of the country's economic diversification in recent years.

However, surface mining has also had negative impacts on local communities and the environment. For example, mining activities have been linked to water pollution, soil degradation, and deforestation, which can have long-term impacts on the health and well-being of affected communities [28]. In addition, mining activities have sometimes resulted in the displacement of communities, loss of access to land and resources, and conflicts with local communities' over compensation and benefits [29].

Effective regulation, transparency, and accountability are essential in addressing challenges of mining in Guineas. Similarly, the government must ensure that mining activities are conducted in a responsible and sustainable manner and that the benefits of mining are shared equitably among all stakeholders. This includes protecting the rights of affected communities and ensuring that they participated in the decisions that affect their lives and livelihoods.

Mining companies also have a part to play in making sure that mining is done in a responsible and sustainable way. For example, companies should set up plans for environmental protection, social management, minimize the risk of pollution, and invest in community development programs that help the communities.

5 CONCLUSIONS

Surface mining has been a big part of Guinea's industrial growth because it has attracted a lot of foreign investment, created jobs, and generated revenue for the government. Guinea's economy has grown a lot of thanks in large part to bauxite mining, which has also helped in the diversification of the economy. Mining has also had negative effects on local communities and the environment. Some of the negative effects are contamination of water supplies, air pollution, and forcing resettlements.

It's important to note that these positive effects happened occasionally, and that they often come with negative effects on local communities and the environment. Effective regulation, transparency, and accountability are needed to make sure that the benefits of mining are shared fairly and that the bad effects are kept to a minimum. Also, mining activities should be done in a way that respects the rights and interests of the communities that are affected and gives them a voice in decisions that affect their lives and ways of making a living.

Surface mining could have been a major contributor to Guinea's GDP and industrial development. however, it is important to find a balance between the economic benefits and the need to protect the environment and the communities living around the mining areas. The government and mining companies must work together to ensure that mining activities are conducted in a responsible and sustainable manner and that the benefits of mining are shared equitably among all stakeholders.

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