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Review

Large scale mining in Ghana: a review of the implications on the host communities

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Abstract

Following the implementation of the Structural Adjustment Program (SAP) in 1983, Ghana's mining sector has experienced significant growth, making Ghana one of the 10-leading producers of gold globally and the largest in Africa since 2018. To this end, the mining industry has been contributing significantly to the country's total export earnings and the overall Gross Domestic Product (GDP). Despite its contribution to the economy, mining in Ghana has been a subject of debate in the past few years due to its diverse impacts on the host communities. This study, therefore, conducted a review of the implications of large scale mining in Ghana. Findings revealed that mining activities gravely affect the quality of water in most mining communities due to the use of toxic substances such as mercury. Mining activities also destroy forest reserves and farmlands, cause respiratory diseases and death. The study, therefore, suggests an effective collaboration between all relevant stakeholders in monitoring mining activities to help mitigate the impacts on the host communities.

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Introduction

Mining has, over the past few decades, contributed hugely to the socio-economic development of countries endowed with mineral resources. According to Gajigo et al. (2012), the end product of mining provides a good source of support for numerous human activities such as construction, farming, and communication. Many farm implements are manufactured from diamond which is obtained through mining (Appiah et al., 2013). Gold as a mineral resource has been a predominant source of material used in the manufacturing of jewelry, official coins, and electronics. A study by Gajigo et al. (2012) indicated that, between 2006 and 2010, jewelry constituted the greatest percentage of gold use (53%) globally, with industry use and safe investments constituting 12% and 35%, respectively. Hilson (2002) has also observed that the mining sector's significant contributions to job creation, export earnings and GDP provide adequate justification for the promotion of global mining in many economies. In countries such as Australia, the recent mining boom has accounted for the mining sector to be considered as one of the country's priority areas over past few years. Mclennan et al. (2017) has maintained that the sector contributed 8% to the overall GDP of the Australian economy in 2012 and provided employment to over 144,000 Australians.

The contribution of mining to the socio-economic development of Africa countries cannot be over emphasized. Appiah et al.(2013) noted that mining contributed approximately 6.5% to South Africa's GDP and 35.5% to total export earnings in 1999 and has until recently been the leading producer of Gold in Africa. In Ghana, the mining industry accounted for 41% of the country's total export, 17.5% to earnings from corporate tax, 27.6% to government revenue, and 6% to GDP in 2011 and continues to be a good source of employment for many Ghanaians(Appiah et al., 2013). Hagos et al. (2016)

has also noted that mining in Ethiopia provides a source of employment for a significant proportion of the unemployed youth and has increased the number of dependants on the mining sector to over 5 million.

In spite of these immense contributions of the mining industry to economic development, many studies have highlighted the negative ramifications of mining on host communities. Kamunda et al. (2016) observed in the Witwatersrand basin of South Africa that mining activities are responsible for heavy metal contaminations in the environment which consequently impacts negatively on the human food chain. In fact, mining is responsible for a number of health related problems in Children, such as tuberclosis, itchy skin, cough, and diarrhoea (Kamunda et al., 2016). Mining in Asgede Tsimbla within the Tigray regional state of Ethiopia has accounted for the reduction in the surface water flows in rivers, evaporation of ground water and the siltation of rivers with the region (Hagos et al., 2016). In areas such as the Indian state of Orissa, mining operations have resulted in the loss of agricultural lands which used to be the main source of livelihoods for the host communities (Mishra and Pujari, 2008).

Similarly, the negative impact of mining operations in Ghana has in the past few years made mining a subject of debate. As a result, many have asked the question as to whether the mineral deposit in Ghana is a curse or a blessing to the country. This position is informed by the adverse environmental, health, social and livelihood implications of various large scale mining operations on the host communities. The implications of large scale mining in Ghana have been exacerbated by the proliferation of illegal mining activities popularly termed as "Galamsey" in some parts of the country. As Tschakert (2009) and Boadi et al. (2017) note, it is estimated that approximately 300,000-500,000 artisanal miners operate illegally in Ghana. Consistent with this finding, Ontoyin and Agyemang (2014) have maintained that the desire to engage in these illegal mining activities is being stimulated by the ineffective policies and bureaucratic process which has served as an obvious impediment in formalizing the artisanal mining sector.

The disturbing implications of both large scale and illegal mining activities have in the past few years generated a lot of public outcry in Ghana. Following these concerns, the Government of Ghana in its attempt to forestall the adverse effect of mining activities on the environment instituted strict measures to regulate the sector. These challenges occasioned by mining, therefore, explains the need for a proper examination of the implications of mining in Ghana. With a focus on the Ghanaian experience, this study conducted a review of the implications of mining operations on the host communities in Ghana. This is necessary for providing strategies to policy actors and Mining Companies with the view to mitigating the adverse impacts of mining on the host communities and the Ghanaian economy.

Historical Overview of Mining in Ghana

Mining in Ghana has been ongoing for over 1000 years now (Basu et al., 2015). Historically, the mining industry has played a critical role in the socio-economic development of Ghana which is being reflected in its colonial name "Gold coast" (Akabzaa and Darimani, 2001). Gold has always been priced as a valuable commodity due to the importance people attach to it as an ornament and because of its value as a basis of currency (Ababio, 2011). It is a widely accepted view that the local people in Ghana were engaged in alluvial mining even before the arrival of the Portuguese in the year 1471. Ababio (2011) notes that gold was mined from hills and estuaries where women and young boys would come to the seashore of Elmina and Axim to pan for gold whenever there was heavy or violent rainfall. Ghana contributed about 39% (8,153,426 fine ounces) to world gold production between 1493 -1600 (*Minerals and Mining Policy*, 2014). During these times, rudimentary tools such as digging hoe and other basic tools were widely used for the exploitation of mineral deposits in the Gold Coast.

The local people's engagement in mining continued until 1933 when promulgation of the Mercury Law during the British Administration led to the banning of the local people from mining. This era marked the commencement of large scale mining activities by the British and other international companies (Akabzaa and Darimani, 2001). The period saw the formulation and implementation of the mining policy with the view to establishing the needed policy, administrative, and legal framework to regulate mining activities in the colony. Banning of the indigenous mining facilitated the process of boosting large scale mining due to the availability of labor, thus increasing mining output during the period 1933 - 1944. The turbulence occasioned by the increased struggle for independence, however, created some level of political risk and loss of investors' interest thus, leading to reduction in Ghana's share of world production of gold between the years 1943 -1952.

Upon gaining independence in 1957, Ghana's mining industry was predominantly state controlled. The government established Companies such as the State Gold Mining Corporation, Ghana National Manganese Marketing Corporation, and the acquisition of shares in Ashanti Goldfields Corporation, Ghana Bauxite Company and Ghana Consolidated Diamond Company with the objective of protecting employment (Akabzaa and Darimani, 2001) whiles increasing the revenue generated from the mining sector. Consequently, the mining industry was constrained due to inadequate capital investment, deterioration of infrastructure, inflation, increased level of workers absenteeism, illegal mining and gold smuggling. The industry, however, begun to witness remarkable growth in 1990 subsequent to the introduction of the Structural Adjustment Program (SAP) by the World Bank in the 1980s which program influenced many reforms in the sector (Garvin et al.,

2009; Hilson and Banchirigah, 2009). According to the World Bank, the mining industry would be an engine of Ghana's economic growth if the government pursued a private-led investment environment whiles retaining the industry regulatory functions (Akabzaa and Darimani, 2001). The industry became the country's main priority sector under the structural adjustment Program in 1983 (Amponsah-Tawiah and Dartey-Baah, 2011). Few of the significant institutional and policy reforms that occurred under the program included the establishment of the Minerals Commission in 1984, the enactment of the Minerals and Mining Code and the Small-Scale Mining Law in 1986 and 1989 respectively, as well as the Environmental Protection Agency established in 1994 (Akabzaa and Darimani, 2001). These reforms were mainly targeted at boosting investor interest whiles promoting Foreign Direct Investments (FDI) in the sector. Following these policy and institutional reforms, Ghana has risen to become one of the 10-leading producers of gold globally and the largest in Africa in 2018, outpacing South Africa which has assumed that position for years. As of 2018, Ghana could boast of about 23 gold mining companies. Additionally, a 2010 report by the United Nations Commission on Sustainable Development (UNCSD) indicates that over 650 registered medium and small-scale mining companies were engaged in the mining of diamond, bauxite, gold, and other minerals. Currently, Ghana has a number of national and international companies undertaking mining exploration in a different part of the country. Areas well noted for mining in Ghana currently include the Tarkwa Nsuaem Municipality, Ahafo, Akyem, Offin Dunkwa, Obuasi, Akwatia, Nsuta, Bibiani, and Konongo (Adu-baffour et al., 2021; Obiri et al., 2016). As of 2016, Ghana's share of the Global Gold production was estimated at 129 tonnes and constituted about 90% of all minerals produced in the country (Ericsson and Löf, 2019).

The positive impacts of mining operations on Ghana's economy are well documented. As Appiah et al. (2013) maintained, the mining industry contributed about 41% to Ghana's total export, 17.5% to earnings from corporate tax, 27.6% to government revenue, and 6% to GDP in 2011 and continues to be a good source of employment for many Ghanaians. The sector provides direct jobs to over 27,000 people in the large scale mining industry and over 1,000,000 individuals in the small scale mining sector (Minerals Commission, 2015). According to 2019 report from the Ghana Chamber of Mines on the performance of Ghana's mining industry, it noted that the mining sector accounts for more than 50% of all FDIs, generates over 33% of all export revenues, and contributes immensely to tax, GDP and employment(The Ghana Chamber of Mines, 2019). The presence of mineral deposits in Ghana has over the years made the country an epicenter of mining and thus a destination for many international mining companies. Even though a number of researchers have outlined the potentials large scale land deals (such as mining)hold for the host country's economic growth (Amponsah-Tawiah and Dartey-Baah, 2011; Bloch and Owusu, 2012; Kuusaana, 2017), others have raised doubt about whether these transactions have any positive implications on the host communities and the nation at large (Richards, 2013). Large scale land transactions especially for mining purposes have often been described by some researchers as detrimental due to their social, economic, environmental and tenure impacts on the host communities. This is globally referred to as "land grab". As Zoomers (2010) maintained, the globalization and liberalization of the land market and the increasing desire for FDIs have created strong relations between individuals and places worldwide. Owing to this, large and small scale mining has been on the rise in Ghana with it accompanying diverse impacts on the host communities.

Environmental Implications of Mining Operations in Ghana

Environmental and natural resources play a crucial role in the socio-economic development of the country. It is against this background that the Ghana National Land Policy as part of measures in ensuring environmental quality, discouraged the undertaking of mining operations in forest areas and in water sources (National Land Policy, 1999). However, in Ghana, mining activities have caused devastating and at times irreparable damage to the environment (Hausermann and Ferring 2018; Adu-baffour et al., 2021;). In fact, as of 1988, it was estimated that the country lost about 41.7 billion Cedis annually through environmental degradation (Amponsah-Tawiah and Dartey-Baah, 2011). A significant proportion of this degradation is attributed to the activities of large and small scale mining activities across the country. As Emmanuel et al. (2018) noted, there has been growing increase in the impact of mining operations on water sources in Ghana, through contamination from heavy metals, leaching, erosion and sedimentation. In the Twifo municipality in the Western Region, the water quality of river Offin and its tributaries, such as river Jimi, has been greatly compromised due to mining activities (Appiah et al., 2013). This is, however, not different in other mining regions such as the Obuasi and Tarkwa municipalities. Emmanuel et al. (2018) observed that mining activities within these regions had affected the water bodies in the area due to heavy metal contamination and the use of harmful chemicals like mercury. These findings corroborate the observation made by the Center for Environmental Impact Assessment, which maintained that the presence of mercury in the environment is through it usage in the process of gold recovery which washes the inorganic components of the metal into river bodies thereby increasing the levels of pollution and turbidity of these water bodies. The rise in the level of pollution occasioned by the use of mercury in mining activities has adversely affected the fish population in these water bodies thereby culminating into low fish and

water supply within most mining communities. As Appiah et al. (2013) observed, the turbidity and toxicity level of the water bodies have impacted on the water supply and increase in water treatment cost resulting in shortage of clean water for domestic, agriculture and other purposes. Studies have also noted that mining activities along river courses have led to the destruction of river banks, thus resulting in the overflow of water into neighboring homes in times of heavy rainfall, leading to destruction of lives and properties(Emmanuel et al, 2018).

Beyond the adverse impact of mining on water bodies, forest reserves are also not spared. Analyzing the implications of mining on the Offin shelterbelt forest reserve, Boadi et al. (2017) found that mining activities have accounted for the loss of an approximate area of 2.5 km sq which represents 4.4% of the total forest reserve. By this level of destruction, the forest reserve is projected to be degrading at an annual rate of 0.88% due to mining activities. Similarly, Asantewaa et al. (2019) also observed that large and small scale mining in the Bibiani Municipality has seriously impacted on forest ecosystem in the Bibiani Forest District and contributed to the rapid degradation of the reserve. In other areas in Ghana, such as the Ahafo region, mining operations have depleted over 86% of the forest cover (Kumi et al., 2021) as well as farmlands within the area. The period between 1986-2002 marked the beginning of a widespread change in land cover in Wassa West District from forest and farmlands to mining pits. A total of about 3168 hectares of forest cover and 4935 of farmlands were lost in the area due to mining activities (Schueler et al., 2011). Similar studies conducted in the Bogoso-Prestea, Twakwa, and Damang indicate serious destruction of forest and farmland due to large and small mining operations. In assessing the implications of large scale mining deals in Ghana, Owusu et al. (2019) observed that mining activities, aside their adverse impact on the health and environment of the host communities also have a marked negative impact on mammal diversity due to noise from mining operations.

Health Implications of Mining Operations

The short and long term health impacts of mining activities are described to be a very dangerous one. Some of the health challenges include cancer and respiratory conditions(Emmanuel et al., 2018). Moreover, Amponsah-Tawiah and Dartey-Baah (2011) observed that mining-induced health challenges recorded between 2002 and 2006 included upper respiratory tract infections and malaria. Highlighting the causes of the increasing incidence of malaria in mining communities, Salifu et al. (2013) noted, the open pits created by mining activities become a breeding ground for Anopheles mosquitoes which is a vector for causing malaria in Africa. Furthermore, exposure to atmospheric dust and other toxic elements from mining operations coupled with stress from the mining activities exposes one to different forms of diseases(Stewart, 2020), such as classical silica-induced pneumoconiosis. The contamination of soil as a result of the mining activities has serious implications on crops and consequently human health when consumed. In line with this, Tepanosyan et al. (2018) have maintained that soil contamination resulting from dangerous mining activities has a non-carcinogenic risk to adults.

Moreover, there has been an unprecedented increase in sexually transmitted diseases in mining communities in Ghana due to a rise in sex trade (Salifu et al., 2013). The influx of many individuals to the mining communities leads to an increase in commercial sex workers who initially migrated to undertake mining operations, the failure of which exposes them to sex trade. In most mining communities, especially in the Wassa West District, sexually transmitted disease has been on the increase since 1992. Mining is also counted as one of the leading causes of death in Ghana. Accidents in mining sites have claimed several lives in many mining communities in Ghana. Reports from Dunkaw Offin in the central region of Ghana indicate that close to about 100 miners were buried in a “Galamsay” pit when it collapsed near the Offin river (Emmanuel et al., 2018). Modern Ghana also reported in 2010 that over 112 small scale miners had been trapped under a mining pit in the Akyempem Breman in the upper Denkyira East Municipal. These victims include a pregnant woman and other individuals between the ages of 17 and 35. In fact, there has been quite a number of incidents of catastrophes from mining pits claiming several lives in other parts of Ghana (Yelpaala and Ali, 2005).

Economic and Livelihood Implications of Mining Operations

Mining is a good source of employment for many individuals in Ghana. A report by the Minerals Commission of Ghana indicates that the mining sector provides direct jobs to over 27,000 people in the large scale mining industry with over 1,000, 000 in the small scale mining sector. (Minerals Commission, 2015). Moreover, the presence of mining activities in some parts of Ghana, such as the Akyempem communities has increased the market size for farm produce due to an increase in the income of miners (Adjei, 2007). Despite these positive implications, mining investments have had severe adverse implications on the living conditions of many mining communities who depend solely on land for their livelihoods. In Ghana, a significant proportion of the rural population depends directly on land for their livelihood through the cultivation of crops on a subsistence basis. As noted by Hilson and Banchirigah (2009) “Throughout rural regions of the developing world, peoples’ livelihoods are structured around an assortment of agrarian activities and complementary subsistence occupations”. However, during mining operations, majority of the smallholder farmers get dispossessed

or displaced from their farmlands, thereby depriving them of their only source of livelihood. Due to land dispossession occasioned by large and small scale mining activities, farmers have lost their major source of livelihood and income, thereby living with the adverse impact of mining operations. For instance, mining operations in communities such as Tarkwa in the Western region have led to farmers losing their farmlands to mining activities (Obiri et al., 2016). Schueler et al. (2011) also found that over 49,353 hectares of farmlands were lost due to mining activities in the western region. Mining operations have over the years rendered about 65% of the small holder farmers jobless in the Tarkwa and surrounding communities (Andrews, 2018). According to Andrews' interview with one respondent in mining communities, the respondent mentioned that the presence of the mining company in the community has rendered him landless and impoverished thereby making it difficult for him to cater for basic needs and to have a decent living (Andrews, 2018). Again, the dispossession of farmers due to large scale mining operations coupled with the destruction of farmlands usually threatens the food security in the affected communities (Wegenast and Beck, 2020). In cases where individuals want to engage in farming, the expanse of land available for farming is very minimal to allow for any productive agriculture investments. With very little arable lands left for farming, the food supply in these communities is unable to satisfy the corresponding demand thereby resulting into an upsurge in food prices and high cost of living (Boadi et al., 2017).

In the absence of adequate jobs for the dispossessed farmers, life becomes quite unbearable for the rural dwellers, especially women, children and the aged since they find it challenging to afford basic needs such as food, school fees among others. As noted by Richards (2013), in most mining acquisitions, women and other vulnerable groups tend to bear the brunt of these acquisitions due to cultural constraints, their lack of participation in land related decisions, and physical limitations. Kuusaana (2017) has also noted that, women and migrants with insecure land rights are usually the losers of most land acquisitions, especially for mining. The unavailability of any plans to restore or reclaim these lands subsequent to the mining activities therefore lessens the amount of productive lands available for farming purposes thereby resulting in unhealthy competitions among the rural dwellers over the limited remaining lands. Occasionally, these unhealthy competitions among affected persons culminate into conflicts. In such condition of land scarcity, access to land for farming is then hinged on the power relation dynamics and one's ability to pay. In most situations, traditional authorities lay claim over lands than the ordinary individual (Andrews, 2018). Such unfortunate situations, therefore, render a greater proportion of the rural population landless.

The destruction of farmlands and landlessness of affected persons are further exacerbated by the delay and non-payment of compensation. By the dictate of the 1992 Constitution of Ghana(The Constitution of Ghana, 1992), all minerals found in their natural state are vested in the President on behalf of the people of Ghana. With this provision, mining concessions granted by the state usually comes with some level of compulsion since the occupier of affected land is left with no option than to vacate. Even though the constitution, the State Lands Act, 1962 (Act 125) and Minerals and Mining Act, 2006 (Act 703) make provision for prompt and adequate payment of compensation to affected persons, these requirements are often disregarded by many Mining Companies (Arezki et al., 2013). In situations where these compensations are paid, they are usually inadequate to restitute the affected persons and provide them with any decent life. In fact, on many occasions, traditional authorities lay claim to the compensation payments for deprivation of land use at the expense of the affected individuals (Kidido et al., 2015). The lack of consultative approach adopted in the grant of mining concessions further aggravates the plight of the mining communities. Arezki et al. (2013) have noted that mining rights are often granted without the knowledge or inputs from neither the community members nor their traditional leadership, thereby increasing the level of hardship suffered by affected small holder farmers.

Managing the Health and Environmental Impacts of Mining in Ghana

The health and environmental implications of mining are diverse. An effective multi-stakeholder collaboration is required where all agencies and stakeholders such as the Minerals Commission, Environmental Protection Agency and the Ghana Health Service work together in mitigating the health and environmental related impacts of mining in Ghana. Furthermore, continuous monitoring of mining operations across the country is required in ensuring compliance to the mitigation measures outlined in the environmental impacts assessments report accompanying the grant of mining leases. Most importantly, considering the reduction in productive farmlands as a result of destruction caused by the mining operations, the government through the Minerals Commission needs to strictly monitor and enforce the reclamation of all mining sites and replanting of loss forest lands subsequent to the mining operations. This exercise is necessary to restore all degraded farmlands and forest reserves to their original positions.

With the disturbing levels of water pollution, government and mining companies must as a matter of necessity, provide mining communities with alternative sources of water for domestic and other purposes. This could best be achieved through a strong partnership between District Assemblies and Mining Companies. Beyond these interventions, Government, Civil Societies and other relevant stakeholders must intensify education on the risk involved in illegal

mining activities to lessen the level of "Galamsay" and consequently reducing the death rate associated with such activities. The realization of this will best be possible by eliminating the bureaucracies and stringent processes that characterizes the mining concession application process.

Managing the Livelihood Impacts of Mining in Ghana

To mitigate the apparent implications of large and small scale mining deals on the small holder farmers, affected persons need to be given prior notice on the mining concession in the affected area based on the prior and informed consent principle. Mostly, the Minerals Commission in granting concession does not engage the affected persons or the traditional authorities in the target community. In the absence of any prior information, the affected persons do not have the luxury of time to either look for alternative land for farming activities or to search for alternative jobs. Thus, potentially affected persons need to be actively involved in the discussion on the mining rights to minimize the impacts suffered.

Furthermore, given the level of economic displacement and joblessness occasioned by the large scale land acquisition, Mining Companies need to roll out effective Alternative Livelihood Programs (ALP) for the affected persons. Whiles it is observed that mining companies at times employ a proportion of the affected persons, studies have maintained that these kinds of employments only capture an insignificant proportion of the persons affected. Moreover, given the tedious nature of the mining activities, women, aged and other vulnerable groups are not able to take advantage of any employment opportunity given in the mining operation. Thus, it is highly imperative that mining companies implement sustainable and effective ALP for the affected persons in order to lessen the level of hardship suffered by the small holder farmers. Even though some Mining Companies have implemented ALP in some communities in the past, Hilson and Banchirigah (2010) have observed that "ALP implemented by mining companies are usually unsustainable and thus implement only a few desirable projects". Therefore there is the need for proper contextualization and involvement of the affected persons in the design and development of ALP to make them sustainable.

Conclusion

Large scale mining in Ghana has serious ramifications on the environment, health and livelihood of host communities. Mining has grave impacts on the water quality and forest reserves in various parts of Ghana. Since a significant proportion of the rural population is engaged in farming as their main source of livelihood, mining results in a mass displacement of the farmers both physically and economically. This, therefore, results in joblessness among small holder farmers perpetuating the level of poverty in the rural areas. Moreover, unlike acquisitions for agro-investments which make it possible for repossession after expiration of the lease, the destructive nature of mining activities leaves the farmland seriously denuded. Affected farmers are then compelled to compete for the limited farmlands which at times results in conflict. The displacement of farmers and the accompanying destruction of farmlands threaten the food security in the host communities. This, therefore, results in a high cost of food and other basic needs, thus consequently increasing the cost of living in the host communities. There is, therefore, the need for effective multi-stakeholder collaboration between all relevant agencies and stakeholders in mitigating these implications.

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