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Africa: Diversity and Development

The impact of small-scale gold mining on mining communities in Ghana

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Abstract

The Ghanaian mining industry is a controversial one. Many believe that the industry has contributed greatly towards the socio-economic development of the country in terms of employment and social infrastructure. However, others believe that the negative effects of mining, especially the loss of fertile agricultural lands, leave the people of mining communities much poorer in relative terms than they were before. This study therefore sought to ascertain the sustainability of the Ghanaian mining industry in the light of this controversy through an examination of the ecological, social and economic features of smallscale gold mining and the impacts on mining communities. It appears that land degradation, environmental pollution and many socio-economic problems have been major issues with communities where small-scale mining is practised in Ghana. Most of these negative impacts are a result of deficiencies on the part of the regulatory bodies charged with monitoring the mining industry. Solutions to these problems are required to ensure that the industry contributes positively to the Ghanaian nation. They include adequately resourcing regulatory bodies, streamlining the process of license acquisition and applying stricter sanctions for offenders. Additionally, regularising and proper monitoring of the informal sector and the provision of environmentally friendly equipment is critical.

Key words: small-scale mining, mining communities, mining industry, mining.

Introduction

The Ghanaian mining industry can be traced back to the pre-colonial era with some studies believing that the industry has contributed greatly towards the socio-economic development of the country in terms of employment and social infrastructure (Amponsh-Tawiah *et al.* 2011; Ghana Chamber of Mines 2010; Yirenkyi 2008). However, others believe that the negative impacts of mining such as water, air and noise pollution and the general deprivation of fertile lands for agriculture purposes leave the people much poorer in relative terms than they were before (Hammond *et al.* 2013; Hilson *et al.* 2006 and Hilson 2002).

It is therefore unclear whether the mining industry in Ghana has actually contributed positively towards the development of the nation. Consequently, it is important to ascertain the sustainability of the mining industry of Ghana by weighing the socio-economic benefits with the negative impacts.

This paper therefore seeks to review the sustainability of the mining industry in Ghana through an examination of the ecological, social and economic features of small-scale gold mining with its impacts on mining communities and suggest possible remedies to arrest the situation.

The concept sustainability of small-scale surface mining in Ghana

Sustainability issues have always been a central goal of many local, national, and international planning bodies, but it is often not clear exactly what it means or how to achieve it (Chappin *et al.* 2009). The word sustainability has been defined in different contexts by different authors. Gallopin (2003) defined it as "any system that can be represented by a non-decreasing valuation function of the outputs of interest of the system being considered". It is therefore important to find out the output aspect of small-scale gold mining in Ghana and whether it is non-decreasing. The United Nations Environment Programme's definition of sustainability also emphasised the use of resources from the environment to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (WCED 1987).

There are, however, several arguments about the applicability of these concepts to the Ghanaian mining industry, especially the small-scale gold mining sector, since mineral resources are non-renewable and are subject to depletion over time. The exhaustible nature of mineral resources places a limit on development of these sectors and hence their sustainability (Amankwah 2004). There has been an ongoing debate by stakeholders in the mining sector on measures to mitigate the negative impacts of small-scale surface mining and assist the industry to grow in a more sustainable manner (Yakubu 2002).

There are also discursions on general concepts of sustainable development and how it can be applied to the small-scale surface mining in Ghana. In sustaining such a sector, it is important to consider in the context processes involved in supply, environmental impact and its assessment, health implications and the socio-economic realities of affected communities.

Small-scale surface mining land use

Surface mining is a broad category of mining in which soil and rock overlying the mineral deposit are removed. This practice which includes open-pit mining, strip mining, and

mountaintop removal mining requires a large area of land to carry out. There is therefore a continuous divergence of interest between land required for surface mining and other land uses such as farming and housing, among others (Yirenkyi 2008).

Small-scale surface mining in Ghana is on the increase with its subsequent repercussions on the environment. It is practised across all areas endowed with mineral resources starting from Nangodi, Yale and Gbani in the Upper East region of Northern part of the country (Tom Dery *et al.* 2012; Yembilla 1997) to most communities in Southern part of Ghana (Yelpaala 2004). The figure below shows the map of Ghana with prospective regions with small-scale mining activities within the country highlighted.



Figure 1: Prospective small-scale gold mining regions in Ghana

The small-scale mining sector employs thousands of people (both local and foreign nationals) but features largely rudimentary, unmonitored and uncontrolled practices (Hilson 2001). The sector has greater economic implication on individuals involved in the business but less on the communities where it is practised. The industry employs a sizeable number of the Ghanaian working population. Although there is no precise small-scale mining employment figures in Ghana, it was estimated to have some 200,000 people involved

directly in the extraction of both gold and diamonds (Hilson 2001) but this figure has shot up to about 600 000 in recent times (Nartey *et al.* 2011). Communities and individuals who would have not benefited directly in the mineral wealth found in their communities are able to benefit from these resources through the small-scale surface mining.

Ecological features of small-scale mining in Ghana

Small-scale mining poses not only serious health and safety consequences for workers involved but also has a significant environmental impact on the surrounding communities (Armah *et al.* 2013). Virgin forest and fertile farm lands located in the middle belt of the country (which includes part of Brong Ahafo region, Ashante Region, Western Region and some parts of Eastern Region) are disappearing as gold mining has become the dominant activity in these areas.

The majority of the challenges posed by small-scale surface mining in Ghana are experienced in environmental degradation and its effects on several ecological systems. Land degradation, mercury pollution (Hilson 2001) and pollution of water bodies are some of the major challenges posed by small-scale surface mining.

Land Degradation: Tetteh (2010) considered small scale surface mining as one of the greatest agents of land degradation and destruction, destroying about 13% of the total forested land in Ghana. A study by Schueler *et al.* (2011) revealed that surface mining resulted in about 58% deforestation and a substantial 45% loss of farmland within mining concessions in the western region of Ghana. Land destruction in the form of excavations are common (Aryee 2003; Yelpaala 2004) and in some places river banks mined to a depth of 35m expanding about 60m wide (Hilson 2002). Land degradation results in a significant threat to biodiversity conservation with devastating effects on soil ecosystems leading to increased soil temperature, loss and depletion of soil nutrients, erosion, changes in topography (Tetteh 2010) destroying ecosystems with its unique habitats, fauna and flora and making the land less productive (Asiedu 2013). The majority of the mining concessions are found in and around forests, agricultural lands and human settlements resulting in competition for land and depriving farmers of access to farming land (Tetteh 2010).

The diagram below (Figure 2) shows typical small-scale surface miners at work resulting in destruction of productive farm land.



Figure 2: Destruction of Agricultural land by surface mining activities in Ghana

Challenges posed by small scale mining is better appreciated where miners leave in their wake unstable piles of waste, abandoned excavations, vast stretches of barren land and unreclaimed excavated pits sometimes filled with water which become death traps as well as breeding grounds for mosquitoes (Aryee, 2003; Yelpaala, 2004). These challenges compel farmers to abandon their farms and farm lands as they are rendered unhealthy, unsafe and unproductive.

Mercury pollution: Mercury is one of the priority toxic elements of global concern (Donkor *et al.* 2006) and is an important environmental problem in Ghana. Mercury contamination can either be through natural means such as volcano eruption and weathering or through a variety of anthropogenic sources such as burning of fossil fuel or mining (Oduro *et al.* 2012). The use of liquid mercury, for example, in small-scale mining continues to pose a serious threat to water quality in many parts of the world including Ghana (Anane-Acheampong-Osisiadan *et al.* 2013). Mercury, when used in the extraction process, forms an amalgam and turns into a stable *methyl-mercury* a compound which when ingested, inhaled or absorbed by fauna and flora becomes toxic to man and the environment (Hilson 2001). In Ghana, small-scale miners use mercury in processing their ore. The waste products in most cases are dumped into water bodies which cause bio-accumulation in the bodies of aquatic animals and can enter the food chain of human beings (Donkor *et al.* 2006). Exposure to mercury can cause kidney problems, respiratory, central nervous and cardiovascular systems disorders, loss of memory, psychosis, reproductive problems, and in

Pollution of Water Bodies: In Ghana, contaminations of surface and ground water bodies have particularly been experienced in gold mining communities (Adetunde *et al.* 2014).

some cases severe complications in children resulting in death.

Chemical processing pollution occurs when chemicals such as sulphuric acid (H_2SO_4) or cyanide (CN^-) used in processing the ore leak, spill, or leach from the processing site into nearby water bodies. These chemicals can be harmful to humans, aquatic and wildlife as a whole. The diagram below shows a heavily polluted river from mining activities.

Figure 3: A water body being heavily polluted by mining activities.

The majority of small-scale surface miners in Ghana wash the waste products from the ore into rivers and other water bodies that served as sources of clean and portable drinking water to the mining communities (Obiri *et al.* 2010). Others too release mine tailings directly into rivers and this introduces large amounts of suspended solids and contaminants directly into aquatic habitats (Serfor-Armah *et al.* 2006). Mine tailings are often toxic and pose serious health threats to human, animal and plant life (Hayford *et al.* 2009).

A recent research by the Council for Scientific and Industrial Research (CSIR) in Ghana has revealed that many mining communities in the Western Region are at risk of health-related issues from heavily polluted water bodies by small-scale mining activities in the region (Yeboah 2013).

The social features of small-scale surface mining in Ghana

The social impact of surface-mining in Ghana is receiving increasing attention in recent years. Even though mining in general is seen as a vital economic propellant for most developing countries like Ghana because of its potential to facilitate industrialisation along with creation of jobs, it can also be a source of social discontent, civil unrest and other high social cost. The social cost of mining interacting with other cultural issues calls for more concerted efforts in addressing them. Displacement of communities, influx of migrant miners

with its impact, substance abuse and high cost of living are some of the social challenges associated with small-scale mining in Ghana.

Displacements of communities: In Ghana, many communities have been displaced totally as a result of mineral deposits found in those communities. For instance, according to Antwi-Boasiako (2003), fourteen (14) communities with about 30,000 inhabitants have been displaced totally between the periods of 1990 to 1998 as a result of mining activities and investment in Tarkwa and its environs in the Western Region.

Some members of the affected communities had to migrate in search of farmlands while others were relocated to different communities by the mining companies. Relocation of communities leads to loss of social ties, psychological problems and disturbance to the communal way of life (Yirenkyi 2008). The mass migration of people from the affected communities to Tarkwa township had a lot of consequences on the town. There was increased pressure for accommodation and an astronomical increase in unemployed youth who as a result engage themselves in illegal mining. A problem of this kind also has the tendency of generating other social problems such as teenage pregnancy, high levels of truancy, drug trafficking, prostitution, high school dropout rate and disrespect among the youth (Owusu 2012; Antwi-Boasiako 2003).

Impacts of migration on mining communities: According to the report from the International Institute for Environment and Development (IIED, 2002), one of the most significant impacts of mining activities on mining communities is the migration of people into the mining communities, especially in the cases of developing countries where the mine is the dominant and viable economic activity in that area. In Ghana towns like Konongo, Obuasi, Tarkwas, Kwaebibrem and Nkawkaw have had a lot of influx of youth from other towns as a result of the mining activities. Meanwhile in Bolgatanga and its environs in the North-Eastern part of Ghana, from where the youth normally migrate to the southern part of the country for greener pastures, the migration phenomenon associated with small-scale surface mining is seen as a blessing (Agyemang 2010). The influx of small scale surface gold miners into Bolgatanga, as well as men and women providing support services resulting in the acquisition of tracts of land for mining and a new value for land has brought about changes at the community and household levels.

Substance abuse: It is very common experience among many residents of mining communities that addictive substance abuse is on the increase in those areas. The use of drugs and alcohol is a growing problem among the small-scale surface miners in particular. The drugs are consumed with the notion that they would stimulate them to work hard. The

small-scale mining business which involves excessive physical exertion, is taxing, energy consuming and risky hence the high substance abuse such as alcohol, marijuana and cocaine (Amponsah-Tawiah 2011). This has also resulted in a lot of health-related problems like mental disorders and skin problems among these workers.

High Cost of living: The cost of living of mining communities in Ghana is relatively high (Antwi 2010) as compared to other communities without mining. Wages or incomes of mine workers are used as a decider for goods and services in those communities neglecting the plight of the non-mine workers (i.e. government workers, farmers etc). For example, according to (Akabzaa *et al.* 2001) the salaries of the Ghanaian staff in the mine-related jobs are quoted in US dollar terms and as a result they have a higher income levels than those employed in the government sector. In addition, the expatriate staff is paid internationally competitive salaries whilst a small-scale miner's profit exceeds the salary of a government worker tenfold. Given these disparities of incomes within the same community, pricing practices for goods and services tend to favor those with high incomes.

The economic features of small-scale surface mining in Ghana

The mining sector is credited with having an influential impact on the Ghanaian economy. Ghana is currently Africa's second largest gold producer after South Africa, with gold exports accounting for over 40% of total export earnings (Tschakert & Singha 2007). The sector has being a source of employment (both formal and informal) to many Ghanaian and foreign nationals. Income from royalties, corporate taxes from mine companies and income taxes from mine works have been major sources of revenue for the Internal Revenue Service (IRS) in Ghana.

Employment: There was an upsurge in formal employment figures from little over 15,000 in the year 1987 to about 22,500 in the year 1995 (Ghana Minerals Commission 2000) whilst the informal employment in small-scale surface mining was about twice in the formal sector at the same time (Akabzaa *et al.* 2001). Formal direct employment by producing members of the Ghana Chamber of Mines as at the end of 2004 stood at 10,624 of which 1.4% of total employees were expatriates and the rest being Ghanaians. These statistics does not include employees in exploration, mining support service companies as well as suppliers to the large-scale mining companies, contractors, and those companies not registered with the Chamber of Mines (Salifu *et al.* 2013).

Foreign exchange and Tax Revenues: Ghana had an appreciable increase in the production of minerals in the year 2005 with gold becoming the number one foreign

exchange earner overtaking cocoa. Revenues from the mineral resources shot up by 197 million dollars between 2004 to 2005 and accounting for about 13% of the total collection of the Internal Revenue Service. There was an increase of 63% of gold production with its export revenue increasing about 173 million dollars (Salifu *et al.* 2013). Another major contribution of the sector to the economy of Ghanaian according the annual report of Ghana Chamber of Mines (2012) was by payments of royalties, income taxes and corporate taxes on wages, salaries and dividends. The sector is currently the largest contributor of royalties, constituting 98% of all royalties paid to the government of Ghana for the last decade.

Contribution of small-scale surface mining to the Ghanaian Economy: It is important to note that the contribution of small scale surface mining has a significant input on the overall mining sector's contribution to the national economy. From 2000 to 2008 it contributed about 12% of the total gold production and about a 90% of diamond production. It is estimated that more than half a million people are directly involved in the small-scale surface mining business and again about the same number of people also benefit directly or indirectly from the activities in small-scale surface mining. This means that the small- scale surface mining industry in Ghana has a significant impact on the Ghanaian mining sector and subsequently on the country's economy as a whole.

Regulatory issues in small-scale surface mining

A Mineral and Mining Act, 2006 known as Act 703 has been passed in Ghana and the law identifies small-scale mining and defines it as 'mining by any method not involving substantial expenditure by an individual or group of persons (Aryee 2003). It requires that people engaged in small-scale mining are licensed to mine either from the Minerals Commissions' concessions or from a mining company with a concession right in the mining area (Yelpaala 2004). A small scale operator or miner will be licensed to mine a designated plot of land not exceeding 25 acres for a period of 3-5years (Hilson 2001) and the license is granted to Ghanaians aged 18 years and above (Aryee 2003).

The law however, requires a licensed operator to produce an environmental impact assessment for his activities which must demonstrate how the mining activities have been planned in an environmentally sensitive manner, and that appropriate measures have been integrated into the design to protect the environment. This should be accompanied by a quality reclamation plan which should specify among others how topsoil will be preserved, slopes will be stabilised and restored, progressive reclamation will be carried out, and how re-vegetation will be effected (Yelpaala 2004). The concessioner will be expected to post a pre-mining financial assurance or security in the form of cash, letters of credit, surety bonds or trust fund to cover the cost of any environmental damage (Tetteh 2010). This amount is what is used to reclaim the mined site in case of default and where the community or regulatory authority is satisfied that reclamation has been effective, a closure certificate is issued, allowing refund of whatever amount was awarded for reclamation.

The key regulatory institutions in the mining industry

Regulations and mechanisms for monitoring to ensure compliance within the small-scale mining sector are done through a number of regulatory bodies. The under listed are six major regulatory agencies in Ghana ensuring compliance in the mining sector.

1. The Minerals Commission

The Mineral Commission is responsible for regulating and managing all the mineral resources of Ghana. It also co-ordinates and implement policies that relate to the mining sector. The Mineral Commission serves as an advisory agency to the Government in mineral issues. Apart from the supervisory functions the Commission plays, the Inspectorate Division within the Commission is tasked with a special responsibility for enforcing all the mining regulations.

2. Inspectorate Division

This was established with the responsibility of enforcing all mining regulations to ensure health and safety in all mining operations. Before a mineral right holder can start any mining activity, the Inspectorate Division must be satisfied with the supposed project and then issue an operating permit. The Inspectorate Division is headed by the Chief Inspector of Mines and he is mandated by Law to inspect all operational activities concerning mining and also to ensure compliance of all rules and regulation governing the industry.

3. Forestry Commission

Regulating the use of forest and wildlife resources, conserving and managing those resources and coordinating all policies related to these resources are the duties of the Forestry Commission. In the mining sector, section 18 of Act 703 requires a mineral right holder to obtain a permit from the Forestry Commission before any activity can be undertaken. A committee consisting of the Forestry commission, Minerals Commission, Environmental Protection Agency, the District Assembly, and the Ministry of Lands and Natural Resource monitors the activities of holders of mineral right who have been given a permit in any forest reserve. A holder of mineral right is expected to submit feasibility reports to the committee. Mineral right holders who operate outside the framework could lose their mineral rights and even be sanctioned appropriately.

4. Water Resources Commission

The Water Resource Commission was established under Act 522 of 1996 which is the Water Resources Commission Act. The regulation and management of the utilisation of water resources are the main responsibilities of the commission. It also ensures co-ordination of any policy in relation to these resources. The commission is mandated under the Act 703 section 17 to give water rights to any mineral right holder.

Subject to obtaining the requisite approvals or licenses under Act 522, a holder of a mineral right may, for purposes of or ancillary to the mineral operations, obtain, divert, impound, convey and use water from a river, stream, underground reservoir or watercourse within the land the subject of the mineral right (Act 703 section 17).

This section of the Act 703 has deficiencies which have allowed mining companies to pollute water bodies. The right to a water body does not extend beyond the boundaries of the land covered by a mining right. So any activity that will affect the quality of the water downstream should be critically examined. The law does not spell out how these water resources should be used in ensuring the quality is maintained. This has contributed to increasing cases of water pollution in almost all the mining communities in Ghana.

5. Environmental Protection Agency (EPA)

The EPA has the responsibilities of enforcing environmental regulations. Section 18 of Act 703 and the Environmental Assessment Regulations, (L.I. 1652) of 1999 of the EPA, requires an environmental permit from the EPA by a mineral right holder in order to undertake any mining activity. The EPA monitors the activities of the mineral right holders regularly to ensure compliance with the terms and conditions by which it was granted. The EPA has the power to cancel, suspend or revoke a permit or certificate and/or sanctions offenders. Even though the EPA has been given all these powers, under resourced of the agency has made it less effective.

6. Lands Commission

The Land Commission is the regulatory body given the overall responsibility of ensuring the prudent management of the nation's lands and its resources. The Land Valuation Board under the Land commission is responsible for the valuation of lands and other land related properties during compensation to individuals by mining companies.

Section 9 subsection 1 of the mining Act 703 states (Act 703:9(1)

Despite a right or title which a person may have to land in, upon or under which minerals are situated, a person shall not conduct activities on or over land in Ghana for the search, reconnaissance, prospecting, exploration or mining for a mineral unless the person has been granted a mineral right in accordance with this Act". Act 703:9(1)

Meanwhile, some traditional leaders of mining communities have granted parcels of land to individuals and groups including foreign nationals in their own capacities and exploration has occurred without the knowledge of the Mineral's Commission. This has been another legislative deficiency on the part of the Land commission whose duty is to monitor all activities pertaining to mining on all lands in Ghana.

Solutions to problems caused by small-scale surface mining

The under listed are some aspect that will help solve the problems posed by the activities of small-scale surface mining:

Resourcing the regulatory bodies

Monitoring environmental violations and enforcing the rules that combat those violations have been difficult due to a lack of resources and the widely scattered and inaccessible nature of small-scale mining (Anane-Acheampong-Osisiadan *et al.* 2013). Complete compliance in the mining sector therefore needs effective and well resources regulatory bodies. All the regulatory agencies like any other governmental agencies in Ghana rely on meager government subventions which are not reliable. This really makes monitoring very difficult as most of these illegal mining activities are done in the remote part of society and lots of resources are needed in order to monitor properly. In recent years other security agencies like the Ghana police and the Army have to assist in the monitoring operation as some of the miners (illegal ones) are armed with sophisticated weapons.

Streamline the processes in acquiring a license

The licensing process is lengthy, bureaucratic, and unnecessarily complex. As a result, only wealthy and powerful people are able to obtain mining titles, while poor people in the hinterlands that need them the most because of poverty, are unable to obtain licenses to operate. Meanwhile, small-scale surface mining (including informal sector) offers jobs for millions of poor Ghanaians, who may not have any alternative income-generating options. Also the cost of acquiring a license is also very high for beginners in the industry to afford. This has all also contributed to people deciding not to start the process of obtaining a mining permit and operating illegally.

Stricter punishment for offenders

According to the mining Act a license for small-scale mining operation shall not be granted to a person unless that person is a citizen of Ghana, has attained the age of eighteen years, and is registered by the office of the Mineral Commission. Meanwhile some traditional leaders who have land rights have sold them to foreigners who are into illegal small-scale surface mining. According to Hilson *et al.* (2014) about 50 000 gold prospectors have left China alone for Ghana since 2005. The majority of these Chinese immigrants are into the informal small-scale mining which is reserved for Ghanaian nationals only. A jail sentence or even a harsher punishment will deter other traditional leaders from engaging in such unlawful transactions. Huge fines and repatriation to one's home country will also deter other foreign nationals in engaging in small-scale surface mining.

Also non-compliance mining companies or company which has deviated from the initial environment impact assessment on which the license was granted must lose their mining right after been fined to solve the problem they have created. Even though there have been reported cases of environmental degradation as a result of non-compliance of mining companies it uncommon for mining rights of companies to be cancelled in Ghana.

Regularize the informal sector (galamsey)

Although there has been legislative instruments regularising the activities of small-scale miners, much more needs to be done in order to bring all players on board. The informal sector of the small-scale mining (locally known as galamsey) is not recognised in any aspect of decision making yet they form quite a sizable proportion of players in the mining sector. Their activities have more far reaching consequences than rest of the sector. As a result of their unmonitored activities, they have been blamed for most of the negative impact of mining in Ghana. In trying to curb this situation, it will be prudent as a country to regularise the activity of these miners in order to be able to monitor them. Government must therefore establish policy plans to regularise the activities of the informal small-scale surface miners so that they could be monitored.

Provision of environmentally friendly equipment

Beside the degraded lands the next most affected ecosystem is river bodies. Most rivers providing communities with drinking water are heavily polluted by the activities of surface mining. The cost of treating such water by the Ghana water company limited has shot up dramatically and has raise a lot of public debate on the future of our survival as country in getting affordable potable water.

Government through the district assemblies should build mechanised bole-holes and large basins into which water from these bole-holes would flow for use by the gold miners, rather than use water from river bodies for that process. The miners would then be charged on the basis of pay-as-you-use. Such an innovation will bring income to the district assemblies whilst helping preserve the water bodies that serve most communities with drinking water.

Conclusion

The small-scale mining industry in Ghanaian can only contribute meaningfully towards the socio-economic development of the country in terms of employment and social infrastructure if the social and ecological challenges posed by the sector are addressed appropriately. Addressing these challenges will enable mining communities in Ghana to also benefit positively from the mineral deposits found in such communities.

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