

Greener Journal of Social Sciences

ISSN: 2276-7800

ICV 2012: 5.99

Impacts of Mining on the Natural Environment and Wellbeing of Mining- Fringe Communities in Prestea, Ghana

By

Michael O. Erdiau-Kwasie

Dr. Romanus D. Dinye

Matthew Mabunyewah

Research Article

Impacts of Mining on the Natural Environment and Wellbeing of Mining-Fringe Communities in Prestea, Ghana

***¹Michael O. Erdiau-Kwasie, ²Dr. Romanus D. Dinye,
³Matthew Mabunyewah**

¹(PhD Student), Faculty of Business and Law, Australian Centre for Sustainable Business and Development, University of Southern Queensland, Toowoomba, Queensland, Australia.

²Head of Department Centre for Settlements Studies, College of Architecture and Planning, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

³Department of Planning, College of Architecture and Planning, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

Emails: ²rdinye2004@yahoo.co.uk, Tel: +233541349201, ³mabunyewah@yahoo.com, Tel: +233277966690

*Corresponding Author's Email: michael.erdiau-kwasie@usq.edu.au/ michaelodei2012@yahoo.com, Tel: +6170415155847/ 0469637366

ABSTRACT

Although Small Scale surface mining has grown significantly in the developing world in recent decades, the hive of environmental and socio-economic discontents that accompanies large-scale surface mining activities are very much unprecedented. This paper therefore examines the operations of large scale mining group in the context of such discontents, in the case of Prestea, a vibrant mining town in the Prestea-Huni Valley District Assembly Area in the Western Region of Ghana. Case study approach within a naturalistic and interpretivist paradigm is the research design for this proposed study. The specific case involves the activities of BGL within the context of community safety and sustainability. Both quantitative and qualitative primary dataset were used in this study, coupled with observations and site visits. In-community survey was carried out with a total of seventy respondents (including mining employees) and SPSS analysis was done on the gathered data. The qualitative primary data were collected using in-depth, semi-structured interviews with representatives of case company and stakeholder institutions and departments. Secondary data from case company and stakeholder institutions were subjected to content analysis. The findings of the study reveal that although the economic contribution of the mining sector towards the area's economy is significant, the environmental and social wellbeing of host communities do not receive equal enthusiasm and attention from the case company. The paper therefore critically assesses the effectiveness of the current remedial measures by the case company and makes policy recommendations to promote cleaner and safer production.

JEL Classification: L72, M14, H7, Q53

Keywords: Large-Scale Surface Mining, Natural Environment, Community safety and wellbeing, Environmental and socio-economic discontents, Prestea.

INTRODUCTION

The mining industry plays a pivotal role in the history and development of local communities or municipal regions around the world. For instance, the city of Kalgoorlie in Australia, founded in the late 1890s after the discovery of gold in the area, contributed much to the economic and social development in the state of Western Australia and has become the largest Australian outback city. Also, in the United States, the gold rush in California and the subsequent discoveries of metals in Nevada in the late 19th and early 20th centuries have helped realize the American dream in the West. Similar experience in Africa can be shared in the case of South Africa, where gold and diamond mining generated economic development in the metropolis of Johannesburg, which is now South Africa's chief industrial and financial centre, accounting for 16% of the country's GDP and 20% of its exports (Li et al, 2012). The mining industry also contributes indirectly to the local economy by multiplier effects through its links with other sectors. The

connections include indirect linkages, such as purchasing goods and services for mining production inputs, and direct linkages, such as processing of ores or concentrates, and expanding of local infrastructures in areas they operate. It is evidenced that most mining operations are concomitantly executed with the establishment of infrastructures and services (airstrips, railways, roads, water supplies, sanitation systems and electricity) which heavily benefit communities within and beyond the local mining area, and this is particularly true of communities in developing economies.

However, mineral development has inevitable adverse impacts on local development, environment and urban ecology. This consequently result in the whole process of mining-led development being characterised with conflicts between corporate mining objectives, recipient community needs and governmental policy goals for regional development (Oyejide and Adewuyi, 2011; Bice, 2013). Given the wide range of environmental and social discontents that are associated with the activities of the mining industry, as discussed in past literature (Moody and Panos, 1997; Warhurst, 2001; Dale 2002; Peck and Sinding, 2003; Richards 2009), most mining communities are therefore perceived to experience 'poverty in the mist of plenty' (Oyejide and Adewuyi, 2011). The environmental deterioration caused by mining occurs mainly as a result of wasteful and inappropriate working practices and rehabilitation measures. Akabzaa, (2000) argues that mining has a number of common stages; each of it has a potential adverse impact on the natural environment, society and cultural heritage, the health and safety of mine workers and the environs of mining communities. Potentially adverse impacts of mining range from the degradation of the natural environment to the displacement of local people as well as the marginalization and oppression of people belonging to lower economic classes (Tauli-Corpuz, 1997; Ahluwalia 2007; Li et al, 2012).

The story of the mining industry in Africa is not an exemption from the global trend, as the continent is estimated to host about 30 percent of global mineral reserves and a major producer of several of the world's most important minerals and metals including gold, platinum group minerals (PGMs), copper, nickel, diamonds, aluminium, uranium, manganese, chromium, bauxite and cobalt (Ettler et al, 2011). Mineral resources, as other natural resources, are critical to the economic and social development of African countries yet it has devastating impact on both the natural environment and the wellbeing of people in the operated communities. It is also widely acknowledged that because of economic pressures and slower evolution of environmental awareness, local communities have been particularly exposed to the detrimental effects of contamination arising from mining and its effects on aesthetic characteristics, hydrologic systems, atmosphere, flora and fauna, fertility of soil, as well as human health. In addition, the legacy of mining has left thousands of sites in Africa contaminated by mining and associated mine dumps such as tailings and slag material (International Council on Mining and Minerals (ICMM), 2007).

In Ghana most mining towns typical among which include Tarkwa, Obuasi, Prestea, Bogoso, Konongo, Bibiani and Kenyasi in Ghana have experienced a positive change in their economy as a result of the lucrative nature of the sector. Nonetheless, the proliferation and expansion of the activities of gold mining companies has brought in its wake widespread environmental degradation meld with social disintegration. According to Noronha (2001), the social and economic impacts of mining are pervasive in regions where operations are newly established or are closing down. This view is evidenced in towns like Konongo in Ghana where the closure of the major mines in the region led to a huge social disintegration through migration of economically active group in search of greener pasture in other nearby towns. In extreme cases, such social disintegration gives rise to ghost communities in the long run.

Although authors like Hilson (2011) and Cheney et al. (2002) have made exciting observations in recent times that companies in the mining industry are making conscious efforts to regulate their impacts on host communities, such interventions are still in its infant stage. Host communities consider to suffer the consequences of mining operations most especially in developing countries where the power held by local communities in such process is highly marginal. As a result of this, the paper critically assesses these environmental and social discontents that have characterised the operations of companies within the mining industry, with a case company operating in the PresteaHuni-Valley district in Ghana.

Rationale for the Research

The main driving force of this paper is to critically assess how large-scale surface mining groups handle the hive of environmental and social discontents that materialises as their operations unfolds. In furtherance it sought to identify possible ways of tapping the opportunities of the surface mining sub-sector as a mechanism of reducing poverty among local residents without compromising on environmental quality. The questions which this paper seeks to answer include the following: i) What are the environmental and socio-economic discontents associated with large-scale surface mining activities? (ii) What is the effectiveness of remedial measures by case company towards rectifying such discontents? (iv) What policy recommendations can be made to ameliorate the current situation?

Mining Operations in Ghana

In Ghana, mining operation commonly takes the form of either small-scale or large-scale mining. The mining type that will be given much focus is the large-scale surface mining. The general processing techniques are drilling, blasting, haulage of the ore, crushing and screening, agglomeration, haulage and stacking. The technique differs between large and small-scale mining and also varies depending on the type of deposit and its location (Ntibery et al., 2003).

Large-scale Surface mining in Prestea

Large-scale mining is today conducted as surface mining. Cyanidation is the most common technique used in the study area and is used for non-sulphidic pale placer ore (Akosa et al., 2002; Kortatsi, 2004). This technology is typically conducted as drilling, blasting, haulage of the ore, crushing and screening, agglomeration, haulage and stacking. Lime (CaO) is now applied to the ore to raise the pH to between 10.5 and 11.0. Sodium cyanide solution (NaCN) is used for dissolution of the gold. The prepared ore is heaped into plastic lined pads but between 45- 450 l/day of sodium cyanide solution per hectare possibly leaks out into the environment before gold is recovered through electro winning (Kuma & Younger, 2004; Akosa et al., 2002; Kortatsi, 2004).

At the moment 168 small-scale surface mining concessions are valid in the Western Region (Ntibery et al., 2003). At present there are totally about 237 companies (154 Ghanaian and 83 foreign) prospecting for gold and another 18 are operating gold mines in Ghana (Hilson, 2002). Bogoso Golden Star Company is a typical Surface Mining Company operating within the Prestea-Huni Valley District and the research therefore focus on its operations and the external impacts on the environment and the community wellbeing as a whole..

Impacts of Large-Scale Surface Mining

Large-Scale Surface Mining has in recent times and the past had a wide dimension of negative effects on environment and livelihood of the local people who reside in the area of their operation. For the purpose of this study, attention will be directed to the physical and socio-economic environment of the people which is put under intense threat by surface mining activities.

Natural Environment

Air, climate, water resources, soil and vegetation form the key environmental variables that will be considered for this study. Here, the effects of surface mining on these variables and the impacts on the livelihood of the local inhabitants will be captured and discussed.

Firstly, surface mining denies local people of large proportion of lands for cultivation, which constitute the fundamental economic activity for family wellbeing and survival. This is well manifested in the proportion of lands it seizes for its operation. Stickler (2006) confirms in his studies that for surface mining to take place, one needs about six times the land surface needed for underground or deep mining to operate a surface mine.

Also, the high incidence of cyanide mismanagement by several gold mining firms have led to the cyanide contamination of freshwater resources and soils, adversely impacting local fish and wildlife populations and the health and livelihoods of rural farming and indigenous communities. This happens after the ore is extracted, crushed into rubble, piled up in heaps, and sprayed with a weak cyanide solution to extract the gold. The cyanide-laced water and sediment is stored in massive plastic-lined tailings ponds that are supposed to hold the cyanide waste, but the ponds inevitably leak or the dams restraining them fail, allowing cyanide to pollute the water table or nearby rivers and streams (Akabzaa & Darimani, 2001). One of the worst cases of cyanide spillage was caused by Goldfield (Ghana) Ltd in 2001 when a tailings pond of the company ruptured, sending several thousand cubic meters of cyanide-contaminated water into the Asuman River and its tributaries at Abekoase in the Western Region which resulted in several health hazards for the local people residing around these water bodies (Anane, 2003; Hilson, 2006).

Moreover, the physical environment of most people living in communities where the operation of Large-Scale Surface Mining is ongoing is characterised with noise, vibrations and acidic rain. This situation has created poor living conditions for local people due to the huge level of noise and vibrations. Again, it also brings about substantial levels of cracks and weakened foundations in most buildings most especially ones that are just a stone throw from the operation site. In terms of incidence of acidic rain in such communities, the roasting of ore containing pyrite gives a rise to the production of SO₂ in the atmosphere which produces acid rain. The acid water then releases high levels of toxic ions from the rock matrix in the groundwater.

Socio-economic Situation

The socio-economic environment consists of the individuals in an area and their cultural, social and economic activities. The socio-economic externalities of surface mining covers a wide dimension including loss of livelihoods, lower incomes, declines in food production, and higher costs of living etc, which has severely threatened household food security in rural and urban areas.

There seems to be an over-increasing rate of change in landuse in areas where large-scale surface mining operation is common. Large-scale surface mining operations control over 70% of the total land area of Tarkwa (some 9,235 km²), and have drastically reduce the land available for farming (Anane, 2003; Hilson, 2006). Because of the loss of agricultural land, the traditional fallow system, which recycled nutrients and maintained soil fertility, can no longer be practiced. This has significantly undermined farmers' income and food security for the community. Due to the impact of mining on the agriculture sector, the region now also has a high rate of unemployment, and the gold mines cannot provide enough jobs to absorb the total number of those agricultural workers who have been laid off.

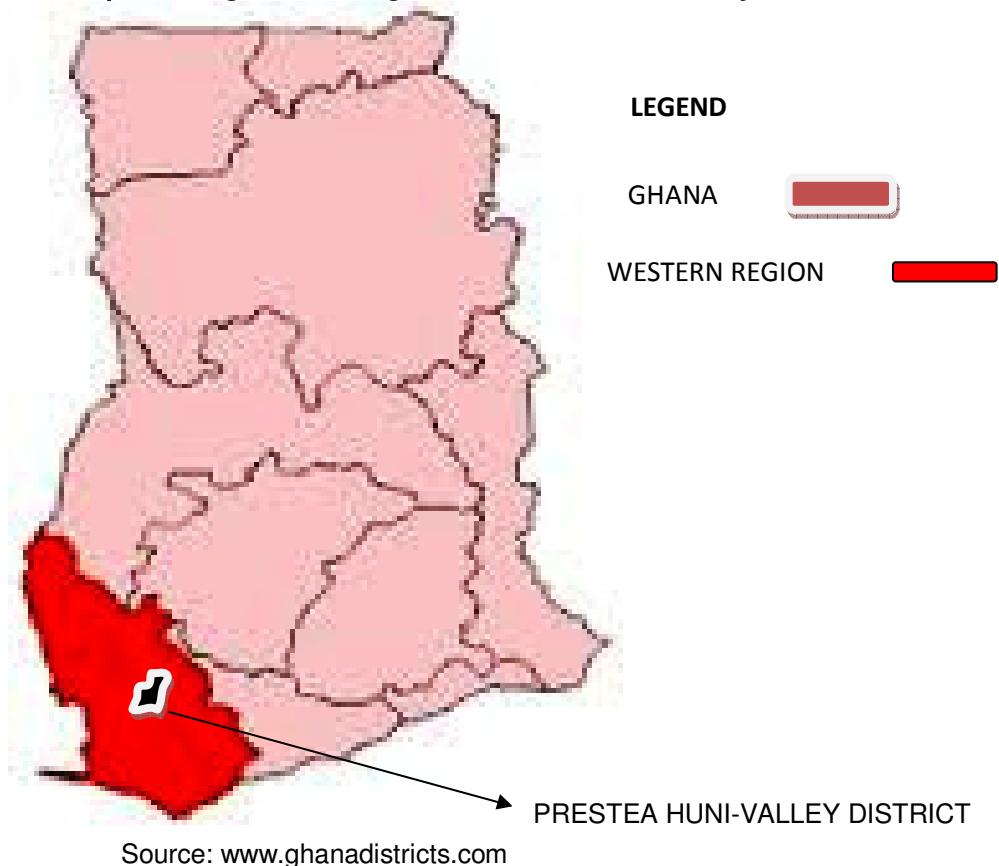
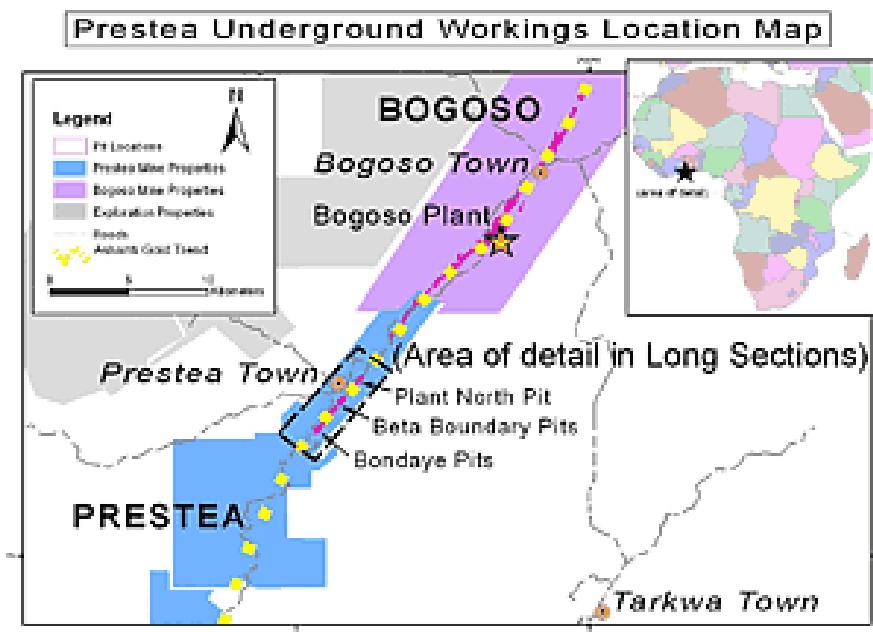
Again, between 1990 and 1998, mining investment in Tarkwa caused the displacement of 14 communities with a total population of over 30,000 (Anane, 2003; Hilson, 2006). Family disorganization tends to be a common problem in areas where surface mining is rampant. The relocation schemes implemented by mining companies have adversely impacted family organization. Some money-conscious male heads of families do opt for cash compensation for relocation, and subsequently abandoned their families, worsening the plight of rural women and children in mine-affected communities.

In addition, there is high rate of prostitution and drug abuse in most communities where activities of surface miners are lucrative (USAID, 2000).The influx of mining activity into some towns in Ghana like Tarkwa has led to flourishing commercial sex trade both by migrant and residents (Dinye & Kwasie, 2012). Harsh economic conditions have also led to growing drug abuse cases in the area, particularly among the prostitutes and migrant galamsey workers (illegal gold miners).

The socio-economic environment of most large-scale surface mining stricken communities is again characterised by high Costs of Living conditions. The disparity in incomes in favour of mining company staff has raised the pricing for virtually all goods and services in such communities and towns (food, housing, healthcare, water, etc.) beyond the reach of the average person. The fall in food production in the region has also contributed to the rise in food prices.

Geographical and Contextual Scope

This paper draws on fieldwork conducted in the Prestea-Huni-Valley District in the Western Region of Ghana. It is an area where surface mining operations are very intense. The District lies within the South Western Equatorial Zone and contains resources such as Gold and timber trees like mahogany, wawa, odum and sapele.

Plate 1: Ghana Map Showing Western region and Prestea-Huni Valley**Plate 2: Prestea Underground Workings Location Map**

RESEARCH METHOD

The research methodology for the study was the mixed-method approach as both qualitative and quantitative data were used for the analysis of the paper. In sampling the unit of analysis for the study, both the purposive and the random sampling techniques were adopted. The purposive sampling technique was used in selecting and interviewing institutions involved in the phenomenon under research. Among such stakeholder institutions include the case company (Bogoso Gold Limited), Environmental Protection Agency, the Prestea-Huni-Valley District Assembly, the Town and Country Planning, the District Health Management Team and the Prestea Government Hospital. Random sampling on the other hand was used to determine the number of respondents for the household survey. With the adoption of the mathematical sampling model by Miller and Brewer (2003), a sample size of 70 was used at a confidence level of 90 percent and a margin of error of 10 percent.

The study used both primary and secondary sources of data. The secondary data was collected from the case company and all other stakeholder institutions sampled for the study. The collected secondary data was analysed using content analysis.

The triangulation approach was adopted for the collection of the primary data for the study. In terms of the qualitative data, an in-depth interviews were performed with representatives of the case company. This helped to validate and fill in gaps in the secondary dataset hence addressing research question two. Again, further interviews were held with representatives from stakeholder institutions such as the Environmental Protection Agency, the Prestea-Huni-Valley District Assembly, the Town and Country Planning, the District Health Management Team and the Prestea Government Hospital. The collected qualitative data was analysed using thematic qualitative analysis. Also, an in-community case study (mining communities in Prestea, e.g. Aketsewa) in-depth household survey with a total of seventy local residents, community leaders and mining employees was carried out. The collected quantitative data was analysed using the Statistical Package for the Social Sciences (SPSS) software. Additional relevant data were gathered using the unstructured interviews, observations and site visits. All the latter activities helped to answer research question one. In the whole, a multi-level analysis was done to assess the nature of such environmental and social discontents and the current remedial measures in place to ameliorate the situation.

EMPIRICAL RESULTS

State of the Physical environment

The physical environment was considered in the context of key variable such as soil, air, water, climate and vegetation for the purposes of this study. These variables or indicators have been selected to ascertain the level of destruction of the physical environment of Aketsewa in Prestea. Considerable areas of land and vegetation in Prestea have been cleared to accommodate surface mining activities.

Currently, surface mining concessions have taken over 70% of the total land area of Prestea. It is estimated that at the close of mining a company would use 40-60% of its total concession space for activities such as siting of mines, heap leach facilities, tailings dump and open pits, mine camps, roads, and resettlement for displaced communities. The result is that a number of communities tend to lose most of their source of livelihood such as farmlands, the forests, water bodies etc hence ultimately affecting their living standards.

The various effects of blasting activities from mining companies and galamsey operators on the physical environment have been very vast and extensive. The various variables stated above have been adversely affected by the activities of miners in the Prestea town. Below are the effects of mining activities on the physical and socio-economic environment based on results from the data collected from the survey conducted.

Environmental Impacts of Large Scale Surface Mining at Prestea

Climate

The climatic conditions at Prestea have been relatively unstable over the years because of the activities of mining companies like BGL. Fall in humidity levels has made the people of Aketsewa, Himan, Krutown and Ankobra in Prestea experience high temperatures over the years especially during the dry season. This conforms to the views shared in the ICMM (2007) report that extracting and using fossil fuels containing hydro-carbons significantly impact climate change. This condition has made life very difficult and unbearable for the inhabitants of Prestea Township as it has resulted in all kinds of problems ranging from farming related ones to ones with their health conditions.

Vegetation

Vast amounts of vegetative cover have been removed through surface mining operations. The recent one is the Aketsewa concession which has left a large pit in the community. 10 bungalows which served hospital staff were pulled down and the place was cleared and mined. This has created a large pit which contains stagnant water and has now become breeding grounds for mosquitoes.

Removal of the vegetative cover at Prestea has also exposed soil to direct impact of rain and this makes it easier for erosion to take place and for the top soil to be removed from the earth's surface. Galamsey operators have left barren lands after their activities leaving large trenches that accumulate water and breeds mosquitoes which pose danger to the health of residents in and around Prestea.

This has also resulted in gross deforestation in vast areas of the Prestea town and this has affected farming activities adversely. The above statements also underpin the widely held view that mining is associated with deforestation, soil erosion, land degradation, air pollution and ecosystem and disruption in which large areas of vegetation and soil are removed. From the field survey, 69% of farmers interviewed complained about losing their lands to miners and this has rendered them jobless and has adversely affected their livelihood.

Air

Air quality at Prestea is found to be very poor, with elevated emission dust levels and lower humidity levels of 70% especially during the harmattan season. The air available at Prestea has been polluted with mercury and other harmful chemicals due to the blasting of the precious stones. This has denied the people of Prestea and its surrounding communities of hygienic air to breath. From the field survey, it was observed that there were a number of respiratory diseases such as tuberculosis, asthma and cold, headache and catarrh whose source has been traced to be the presence of the surface mining activities within the area. Box 1 captures the views shared by one representative from the district health centre on the likely impacts that the mining activities have on health conditions of the populace of the study area.

Box 1: Impacts of Mining on the quality of Air

A representative of the district health Centre of Prestea-Huni valley District Assembly, shared her experience on how mining has impacted on the health of inhabitants of people in Prestea.

"A study of respiratory disease has been carried out in mining communities in the district". According to the respondents, the study revealed that, the prevalence of respiratory related diseases was appreciably higher in the mining communities than non-mining communities. She confidently added that most of such diseases result from chemicals used in the processing of the ore as well as the huge dust emission. Nevertheless, she shared the view that other factors such as smoking are contributing factors for this cancer among the populace.

Investigating into the efforts that have so far been put in place by those concerned, our interviewee made it clear that, several efforts have been made regarding the issue. To her, there has been some level of improvement in the situation as compared to that of five years ago due to some petitions presented to the head of the company, although there is more room for improvement in the situation.

Source: Interview with district health representative. September, 2010.

Soils

Mining effects have rendered many valuable soils at Prestea infertile. Prestea contains forest oxysols and ochrosols and tarkwarian soil, however, due to mining activities, soils in the area have been stripped bare by erosion due to the removal of the vegetative cover. This has led to the quick removal of the top soil which contains the most important nutrients by heavy rains. This has also led to low crop yield and has affected farmers' productivity and income. The resultant effect of low crop yield has made prices of food items expensive and subsequently high cost of living. The soils that have been eroded have cut large gutters in the town and have weakened foundations of buildings.

Table 1: Soil Test for Arsenic Content

Location	Distance	Content in Parts per Million by Weight
Aketsewa	440 Yards	41.1 + 1.0
Aketsewa	½ mile	25.4 + 0.4
Aketsewa	2 miles	12.4 + 0.2

Source: Town and Country Planning Department, Prestea-Huni Valley District Assembly

The findings of the test above indicates that there is high arsenic content in the soil at Prestea. All soils within 2 miles radius are rendered unproductive. This shows that agricultural activities will be adversely affected.

Water

Water at Prestea has been affected severely by mining activities. Water sources have been polluted by mining activities especially their main source of drinking water and their major streams. The pump that used to serve as the main source of drinking water for the Aketsewa community has been sealed with mining waste by the BGL. This notwithstanding, the remaining water sources have been polluted and residents of Aketsewa are faced with problem of inadequate potable drinking water. For instance, the Ankobra Stream and the Subri River which serve as sources of water for surrounding villages for domestic and other purposes have all been polluted by the activities of mining.

Plate 3: A Polluted River in the Prestea-Huni Valley District



Source: Field Survey, September 2010

Socio-Economic Impacts of Surface Mining at Prestea

The effects of surface mining on the physical environment also have socio-economic implications. Over the years the people of Prestea have faced problems concerning socio-economic development. This has come about as a result of mining effects on the people of Prestea. There has been a great impact on the health, income, education, livelihood and the overall existence of the people of Prestea especially those at Aketsewa. To ascertain the level of impacts of mining on the socio-economic environment, the following indicators were considered; income, health, education, unemployment and incidence of HIV/AIDS.

Health

The health of the people of Prestea has been affected adversely due to the effects of mining activities. Many people have suffered several ailments as a result of mining activities. Various households complained of diseases such as cold and diarrhoea, malaria, respiratory diseases, skin diseases etc. These diseases especially malaria is common due to the fact that Aketsewa is an area that breeds a lot of mosquitoes. This situation is as a result of severe soil

erosion that has cut large gullies which store stagnant water in them and breeds mosquitoes. Bad drainage facilities at Aketsewa are also a contributing factor to the breeding of mosquitoes and poor environmental sanitation.

Also, diarrhoea is rampant in the Aketsewa area and was not surprising appearing in the top five diseases among the people of Prestea. This is as a result of the usage of unclean and unhygienic sources of water. Again, cyanide and mercury contamination of the groundwater had led to cases of paralysis, blindness and numerous miscarriages in surrounding villages. During the survey, it was found that about 85% of people were identified with health problems, 63% were suffering from various ailments caused by drinking and eating fish contaminated by the cyanide spillage that occurred at Prestea. Table 2 shows the prevalent diseases identified among the 70 respondents interviewed.

Table 2: Prevalent Diseases in Households from the Survey

Diseases	Frequency	Percentage (%)
Malaria	45	64
Respiratory Tract Diseases	9	13
Diarrhoea	8	11
Skin Diseases	6	9
Hypertension	2	3

Source: Field Survey, September 2010

In addition, it was revealed from the field survey that the most common and recent of the skin diseases is 'shingles' locally known as *Ananse* and 89% of respondents complained of having suffered from this ailment especially during the dry season and 5% and 6% complained of skin irritation and rashes respectively.

In terms of causes of OPD Attendances in the Prestea-Huni-Valley District, the District Health Management Team disclosed that Malaria has been the first on the list of the Top Ten diseases for a number of years without any significant change in the trend for 2007 and 2008 inclusive. According to them, the team recorded 5,115 cases of malaria in 2007 and 5,012 cases in 2008. The table below shows the top ten diseases in the Prestea town for 2007 and 2008. Table 3 shows the top ten diseases in the Prestea town for 2007 and 2008 year period.

Table 3: Top Ten Causes of OPD Attendances

Position	2007	2008
	Disease	Disease
1	Malaria	Malaria
2	Upper Respiratory Tract Diseases	Acute Respiratory Tract Diseases
3	Diarrhoeal Diseases	Diarrhoeal Diseases
4	Skin Diseases and ulcers	Skin Diseases and ulcers
5	Skin Diseases and ulcers	Hypertension
6	Home/Occupational Accidents	Intestinal Worms Infection
7	Hypertension	Home/Occupational Accidents
8	Malaria in Pregnancy	Chicken Pox
9	Chicken Pox	Acute Eye Infection
10	Malaria in Pregnancy	Intestinal Worms Infection

Source: The District Health Management Team, Prestea Huni-Valley District

Income Disparity

Income is a very important necessity to make life worth living it. However, the situation at Prestea is poor as about 70% of the populace of Aketsewa have incomes that cannot take them through a three-square meal a day. Mining activities within the region has been highly detrimental to the development of the agricultural sector which employs a large proportion (65%) of the Prestea populace. 65% of farmers have their lands rendered infertile and therefore cannot produce crops. Farms have been lost to mining activities and thus these farmers do no longer have a source of livelihood, making it hard for them to meet the basic needs of their families like shelter, health, education etc. Results from the field survey revealed that 65% of children of school going age are currently not in school as a result of the fact that their parents who are farmers cannot pay their school fees.

Even where farming is possible, farmers have low crop yield as exposed soils have depreciated in nutrient quality and thereby affecting income levels. Moreover, due to the activities of mining companies, 69% of farmers who have lost their livelihood complained that they can no longer sell or eat produce from their farms due to the arsenic and acidic contents in the rivers which run through their farms. The impact of mining activities is now evidenced as the region begins experiencing a clear disparity in income levels between miners and non-miners. The disparity in incomes in favour of mining company staff has raised the pricing for virtually all goods and services at Prestea (food, housing, healthcare, water, etc.) beyond the reach of the average person. The fall in food production in the region has also contributed to the rise in food prices. The only fuel filling station serving the entire town had been destroyed forcing people to buy fuel at a higher price from the wayside dealers. Box 2 captures the views of one opinion leader who shared his experience in terms of how the mining activities within the region have affected his source of livelihood.

Box 2: Impact of Mining on Income

"With me, I have been a farmer for about 20 years in the whole of my life in Aketsewa community. I inherited three (3) acres of land from my deceased parents in 1991. The plots that were inherited were used in the production of rubber and other food crops. Unfortunately, in 1999, part of my plot was taken away from me for mining purposes. Though I was compensated for the seized plot, the compensated income could not sustain the family for a longer period of time. He argues that he had a reliable source of income from the agricultural activities that he was engaged in most especially his rubber production. This situation resulted in the drop out of his three children from school since their fees were a burden for him to handle. In the conclusion part of the interview, the respondent added that. "I strongly think that the natural resource endowment of Prestea is a curse rather than a blessing for the present and the unborn generation unless urgent and mutually beneficial measures are put in place".

Source: Interview with opinion leader a resident of Prestea. September, 2010.

Unemployment

Unemployment occurs in direct and indirect ways. Mining accounts for the high rate of unemployment in the Prestea area. Large-scale surface mining has taken up large tracts of land from farmers at the same time as mining activities do not provide enough jobs to match the total number of people laid off from agriculture because of the impact of mining.

From the field survey conducted, 75% of the respondents expressed concern that the influx and concentration of mining in the area initially promised alternative and more rewarding jobs for the youth. However, these promises were not brought to light. The frustrations associated with unemployment have pushed some of the youth into various social vices such as drug abuse, prostitution, robbery etc which is posing a lot of threat to the development of the region.

According to the employee database register received from the case company, it was observed that majority (75%) of existing workers were from the big cities like Takoradi, Accra and Kumasi. According to a representative from the Human Resource Division, this phenomenon is as a result of the fact that, youths in host communities lack the requisite skills needed in the company. It was emphasised that most youths drop out of school due to inadequate finances of parents/guardian as well as the quest of the youth to get money from galamsey. From the local residents perspective, the case company denies them such job opportunities and give them out to 'outsiders' who are highly related to people in authority within the company.

Incidence of HIV/AIDS

The influx of mining activity into Prestea has brought both migrant and resident sex workers to the area. The increased incidence of HIV/AIDS in the Prestea Huni-Valley District, the second highest in the Western Region, has been attributed to the flourishing nature of what Dinye & Kwasie (2012) describe as "commercial sex trade". Most of the workers at the mine are migrant workers and young men who are not yet married. As a result of their social status, they prefer to enjoy the company of ladies who are into sex trading. This enhances the spread of HIV/AIDS. Harsh economic conditions have also led to growing drug usage in the area, particularly among the prostitutes and migrant galamsey (illegal gold miners). The trend for reported cases of HIV in the Prestea Hunivalley District has been on the increase since 1992. Reported cases from 2004 to 2008 are shown in Table 4.

Table 4: Incidence of HIV/AIDS

Year	2004	2005	2006	2007	2008
Reported Cases	6	25	37	68	100

High Cost of Living

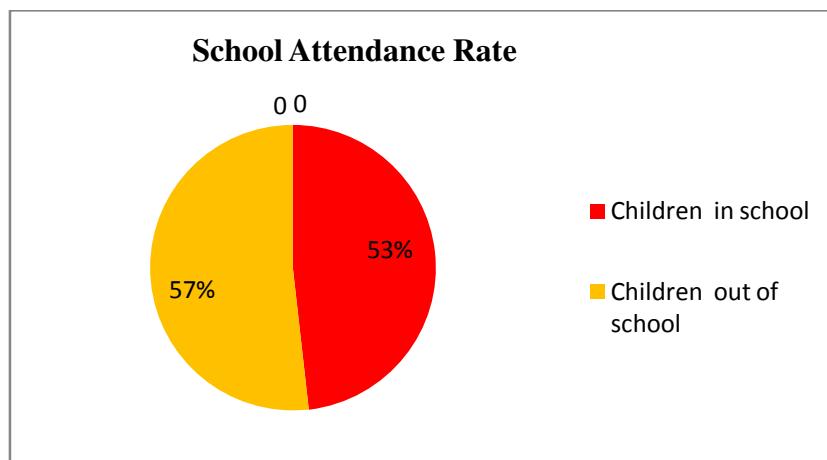
One of the known negative effects of mining is the high cost of living within communities near mine locations. All the indices like food, accommodation, health, water, that make a decent life have a price tag beyond the reach of the average person. At the same time, the traditional sources of recreation and livelihood of the people are seriously impaired by mining activities, a situation that sparks off or aggravates other social problems. According to the survey carried out for the study, two main factors are responsible for the high cost of living in Prestea.

First, 85% of the respondents argues that, there is a wide disparity in incomes among the populace in the Prestea township. It was suggested that such disparity was always in favour of those in the mining industry, at the detriment of their counterparts engaged in activities in other sector of the town's economy. For example, it is evidenced in the Ghanaian mining industry that salaries of its workers are indexed to the US dollar, which raises their income far above their colleagues in the other sector. In addition, the expatriate staffs of the mines are paid an internationally competitive salary, which further widens the income disparities within the Prestea township. This group of high-income earners thus influence the pricing of goods and services such as housing, food and other amenities.

In addition to the above, about 89% of the surveyed respondents shared the view that the mining industry has caused loss of jobs within the area. According to them, a significant percentage of the labour force from agriculture and other land income-generating activities have been made jobless through the seizure of their farmlands by the existing mining company. They added that they are now suffering from the false promise of employment by the mine. As a result of the shortage in land for food production within the Prestea region, it has given rise to exorbitant prices of goods and services, hence a high cost of living.

Education

A report from the District Education Unit of the Prestea-Huni-Valley District states that 'school attendant rate among children of between 9-13 years is high. However, as the children grow from 13-18 years the rate of school attendance reduces drastically by 60%. This means that school drop outs are on the increase at Prestea, with the prime reason being their unparalleled desire to get rich overnight hence engagement in all forms of mining operations such as galamsey. Also, inhabitants of Prestea hold the view that; galamsey is a fast way of getting money as compared to the 'unending' journey that characterises the formal educational system. The piechart below shows that 57% of children who were supposed to be in school but were engaged in menial jobs most particularly associated with mining. Figure 2 depicts the school attendance rate among people within the school going cohort.

**Figure 2: School Attendance Rate**

Remedial Measures by Mining Companies to Mitigate Impacts

The mining company has come up with several measures to solve the many problems caused by their activities within communities in which they operate. The following are measures that BGL has put in place to combat mining problems.

❖ Oil Palm Plantation

The BGL has established an oil palm plantation at the outskirts of Prestea to compensate farmers and to serve as a source of livelihood for the farmers for a long period of time. The oil palm plantation covers large tracts of land which can cater for families of farmers and can also be a source of revenue for the farmers and the entire Prestea community. It will also help improve the quality of life of the people of Prestea.

❖ Provision of Social Amenities

The BGL has constructed two boreholes at Dumasi and Himan to serve as a source of drinking water to compensate them for polluting their source of drinking water. From the survey, the company is in the process of constructing one borehole at Aketsewa to compensate them for dumping mining waste in their only good source of water and polluting the remaining ones. BGL also has constructed a library for the Prestea community to enhance the studies of school children of the entire community not only children of workers at BGL. They have also provided schools in the area with desks and books. They have also provided KVIP to the Dumasi and Bondae communities.

❖ Disposal of mining Waste

BGL currently is embarking on a recycling practices of its' waste. In extreme cases, woods used are given out to employees to make fire and metals are sold to recognised scrap dealers and steel workers. Mining waste is deposited far away from the community and water sources. This is done to reduce pollution levels.

❖ Reduction in Noise and Vibration Levels

In a discussion with the Environmental Officer of BGL, the officer said that the mining company is not oblivious to the plight of the people and that they are taking a number of measures to reduce the adverse impact. He said the measures include the introduction of several delays during blasting in order to reduce the vibration effects, the reduction in the frequency of major blasts and of blasting in the daytime. This is to reduce the noise level and vibration impact since most people would be busy with outdoor activities.

❖ Re-vegetation of Land

According to BGL, 6.5 hectares of land in the Prestea town has been re-vegetated. This was done through a tree planting exercise conducted in the area. This according to BGL will be done continuously to reclaim land and forest lost through mining in the time past.

❖ Road re-grading and Improvement Programmes

The environmental Officer of BGL explained that the road from Aketsewa to the Prestea Government Hospital has been re-graded and improved to prevent erosion activity. The road from the centre of Aketsewa to the Care and Maintenance Unit of the BGL where the pit has been created was also re-graded and improved.

Recommendations for Policy Action

Mineral policy reforms in Ghana have contributed to an enormous increase in mining investment but there has not been a corresponding review of environmental policies to take account of the damage caused to the environment and to sources of livelihood. The consequences have been a deepened crisis of health and environmental sustainability, social upheavals and economic deprivation. Based on the findings and implications from the survey, the following recommendations have therefore been made.

Proper Monitoring Systems on resource use

Mining companies should introduce more vibrant monitoring system to ensure that all their activities that has direct or indirect link with natural resources like underground water, air, land etc. are under effective control. For instance, BGL can thoroughly monitor activities that put checks on all these identified resources such as the use of Millisecond Delays to control blasting activities, Atmospheric-Cleansing Spraying Exercises, as well as the occasional testing of surface and ground water to check purity. Appropriate time frame can be set for such activities to be carried out since that can help identify emerging problems associated with these resources. This well monitored will help improve the current situation in the Aketsewa area and Prestea as a whole.

Extensive Public Health Campaign and Education

There should be an extensive public health campaign and education for all the stakeholders in the area. People should be educated on how their health can be affected by mining activities within their area. The District Health Management Team and the EPA should educate mining companies on how to abide by all health and environmental safety rules and regulations to help safeguard and protect the wellbeing of their workers, host communities as well as their own businesses.

Effective Stakeholder Collaboration

There should be effective co-ordination among public sector mining support institutions and other stakeholders such as the Traditional Councils, opinion leaders and members of the communities affected by mining. This will give communities golden platforms to add views to decisions that directly or indirectly affect their wellbeing as weak collaboration among various stakeholders was the root of most recorded social and environmental problems.

Localised mining policies

Mining policies formulated should prioritise community wellbeing as a key in the total lifecycle of the mine. This, if done, will make mining companies to consider social responsibilities to these communities as obligation rather than being a voluntary action. This will help mining companies to be very sensitive to activities that negatively affect the local folks.

International Law

Government needs to ensure that all legal frameworks that support the operations of mining companies are enforced directly in line with the international mining standards which holistically capture the economic progress of businesses as well as the socio-economic vitality and environmental integrity of host communities. This, if done, will help mining communities to enjoy the net benefits that Veiga and colleagues (2001) described in their studies "mining with communities". The government therefore needs to review activities of BGL so that identified deprived mining communities during the study can be made to develop in a sustainable manner.

CONCLUSION

Although the enormous contribution of the mining industry towards local, national sub-regional and the global economy cannot be overlooked, the industry still is faced with the problem of balancing their need for economic gain with taking responsibilities for the impact their activities impose on community wellbeing. As a result of this challenge, the industry is confronted with the difficulty of meeting market needs and the social licence to operate by host communities (MMSD, 2002, p. xiv) The industry has therefore taken up the challenge in recent times to improve upon their current reputation in terms of economic, environmental and social contributions to their host communities. This is well evidenced in most mining companies where specific departments are created to exclusively handle community related issues of which BGL is no exception.

It was observed from the findings of the study that the case company is significantly impacting various aspects of the region's development through the construction of community centre, public library, borehole for potable water and employment to local folks. Nevertheless, the local residents share a relatively contrasting views to that of the company. According to them, the level of destruction and harm caused to their natural environment by the operations of the mine does not correspond with the compensation given to the community through such social amenities. Again, they share the view that the loss of their reliable source of livelihood (arable land) to the operations

of the existing company continue to be a major hurdle to climb in meeting their daily needs. All these environmental and socio-economic discontents have huge implications on their wellbeing which have been discussed in the paper. Following such complaints and grievances held by the local residents, the case company has and still in the process of putting in place remedial measures to help better the current situation. The paper therefore makes some policy recommendations that could stimulate current interventions to eradicate all forms of discontents associated with the operation of the existing mine.

Considering the complex nature of the interaction between host communities and mining companies, there is the need for a future research to investigate into how local communities can be empowered to effectively engage in decisions that affect their wellbeing. This will help make such interventions by the company more localised and development-driven.

REFERENCES

- Akabzaa TM.(2000) Boom and dislocation. The environmental and social impacts of mining in the Wassa West District of Ghana. Accra, Third World Network e Africa;
- Akosa AB, Adimado AA, Amegbey NA, Nignpense BE, Carboo D, &Gyasi S (2002) Reportsubmitted by Cyanide investigation committee, Ministry of Environment and Science.
- Bice, Sara. (2013). No more sun shades, please: Experiences of corporate social responsibility in remote Australian mining communities. *Rural Society*, 22(2), 138-152
- Cheney, Helen, Lovel, Roy, & Solomon, Fiona. (2002). People, power, participation: a study of mining-community relationships. *MMSD Australia, Melbourne*.
- Dale, B. (2002). An institutional approach to local restructuring: the case of four Norwegian mining towns. *European Urban and Regional Studies*, 9(1), 5-20.
- Dinye, D.R. and Erdiaw-Kwasie, M.O (2012), "Gender and labour force inequality in small-scale gold mining in Ghana", International Journal of Sociology and Anthropology, Vol.4 (10) pp.285-295.
- Ettler V, Mihaljevic M, Kribek B, Majer V, Sebek O (2011) Tracing the spatial distribution and mobility of metal/metalloid contaminants in Oxisols in the vicinity of the Nkana copper smelter, Copperbelt province, Zambia: *Geoderma* 164:73–84
- Hilson, G. (2002). Land use competition between small- and large-scale miners: a case study of Ghana: Land Use Policy, vol. 19, pp. 149-156.Hilson, G. (2006). Abatement of mercury pollution in the small-scale gold mining industry: Restructuring the policy and research agendas', *Science of the Total Environment*, Vol. 362, Pp.1–14.
- Hilson, Gavin. (2011). Inherited commitments: do changes in ownership affect Corporate Social Responsibility (CSR) at African gold mines. *African Journal of Business Management*, 5(27), 10921-10939.
- ICMM (2007d), Tanzania Country Case Study – The Challenge of Mineral Wealth: using resource endowments to foster sustainable development. March 2007. Available at www.icmm.com
- Kortatsi, B.K. (2004), Hydrochemistry of groundwater in the mining area of Tarkwa-Prestea, Ghana: PhD thesis, University of Ghana, Legon-Accra, Ghana.
- Kuma, J.S. & Younger, P.L. (2004). 'Water quality trends in the Tarkwa gold-mining district, Ghana', *Bull. Eng. Geol. Env.*, vol. 63, pp. 119-132.
- Li Z., Antonio Nieto , Yiqing Zhao , Zhiguo Cao &Haiyun Zhao (2012) Assessment tools, prevailing issues and policy implications of mining community sustainability in ChinaMoody R and Panos SP (1997). Environmental assessment of mining projects.<http://www.worldbank.org/mining.xlsO>; 1997.
- MMSD. (2002). Breaking New Ground: The Report of the Mining, Minerals and Sustainable Development Project. London: Earthscan Publications Ltd.
- Noronha L.(2001). Designing tools to track health and well being in mining regions of India. *Natural Resource Forum* 2001;25:53-65
- Ntibery, B.K. &Atorkui, E. &Aryee, B.N.A. (2003).Trends in small-scale mining of precious minerals in Ghana: a perspective on its environmental impact: *Journal of Cleaner production*, vol. 11, pp. 131-140.
- Oyejide, T. A. and Adewuyi, A. O. (2011). "Enhancing linkages of oil and gas industry in the Nigerian economy. Making the Most of Commodities Programme (MMCP)" Discussion Paper No. 8, Trade Policy Research and Training Programme (TPRTP) Department of Economics, University of Ibadan.
- Peck, Philip, & Sinding, Knud. (2003). Environmental and social disclosure and data richness in the mining industry. *Business Strategy and the Environment*, 12(3), 131-146.
- Richards, J.P (Ed.). (2009). Mining, Society and a Sustainable World.*Springer*.
- Tauli-Corpuz V. (1997).The globalisation of mining and its impact and challenges for women. <http://www.twinside.org.sg/bookstore.htmO>

- USAID. (2000). Mining for Gold in Siguiri: A Close Look at a High-Risk Population, Report on Ghana, US Agency for International Development. http://www.usaid.gov/gn/health/news/001226_mines/index.htm
- Veiga, M. M., Scoble, M., & McAllister, M. L. (2001). Mining with communities. *Natural Resources Forum*, 25, 191-202.
- Warhurst, Alyson. (2001). Corporate citizenship and corporate social investment. *Journal of Corporate Citizenship*, (1), 57-73.