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Research Paper

Environmental and Health Impact of Mining on Surrounding Communities

Earth Science

KEYWORDS :

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ABSTRACT

To achieve rapid economic development, many countries resort to various activities to exploit natural resources. One of such activities is mining. Consequently, mining is an important economic activity which has the potential of contributing to the development of areas endowed with the resource. The main minerals produced by large-scale companies are gold, diamond, bauxite and manganese, while industrial minerals such as kaolin, limestone, silica and sand are mainly produced by small-scale operators (Aryee, 2001). While foreigners are the main owners of the large mining companies,Mining activities are associated with lots of environmental and health problems these originate from the methods of mining and processes involved ore extraction. The environmental effects of both surface and underground mining as well as methods of ore extraction it also looks at the associated health effects on residents within the communities. Some activities by Company Limited at intervening in the negative environmental and health effects are also assessed.Mining is viewed as one of the important economic activities which have the potential of contributing to the development of economies. At the same time, the environmental and health impacts of mining on surrounding communities have been major concerns to governments, the general public and stakeholder organizations and individuals. Whiles the contributions of mining activities to economic development of well acknowledged, others contend that the gains from the mining sector to the economy are achieved at significant environmental, health and social costs to the country

Introduction

Mining activities are associated with lots of environmental and health problems. These emanate from the methods of mining and processes involved in the gold extraction. environmental effects of both surface and underground mining as well as methods of gold extraction. It also looks at the associated health effects on residents within the communities. Company Limited at intervening in the negative environmental and health effects are also assessed. To achieve rapid economic development, many countries resort to various activities to exploit natural resources. One of such activities is mining. Consequently, mining is an important economic activity which has the potential of contributing to the development of areas endowed with the resource.

The main minerals produced by large-scale companies are gold, diamond, bauxite and manganese, while industrial minerals such as kaolin, limestone, silica and sand are mainly produced by small-scale operators (Aryee, 2001). While foreigners are the main owners of the large mining companies, and . Small-scale mining activity is statutorily restricted (Aryee, 2001). According to Akabzaa and Darimani (2001), "both foreign and local companies are actively involved in exploration of minerals.

Mining activities have lots of environmental and health impacts. This has emanated from the methods of operation by the mining companies, its effects on the natural environment as well as the people in the surrounding communities. The health cost of mining operations sometimes outweighs the benefits gained. In view of this, Awudi (2002) has maintained that, "despite these positive indicators, the role of the mining industry in the economic development.

The gains from the sector in the form of increased investment are being achieved at great environmental, health and social costs to the people, recording series of public outcry against the mining companies operating in who themselves are yet to explicitly concede that their investments are inherently a major pollutant and a source of social conflicts around (Awudi, 2002).

Surface Mining or Open Pit

Surface mining method involves the removal of the top soil up to the bedrock which bears the gold ore. Heavy machines of varied types are usually used for this purpose. Gold bearing rocks, when reached after the removal of the overlying rocks and soils, are blasted with dynamite and other explosives before gold is finally extracted. Open-pit (surface) mines are used when deposits of commercially useful minerals or rock are found near the surface; that is, where the overburden (surface material covering the valuable deposit) is relatively thin or the material of interest is structurally unsuitable for tunneling (Wikipedia, 2007). Open-pit mines are typically enlarged until either the mineral resource is exhausted, or an increasing ratio of overburden rocks to the ore makes further mining uneconomic. When this occurs, the exhausted mines are sometimes converted to landfills for disposal of solid wastes. However, some form of water control is usually required to keep the mine pit from becoming a lake (Wikipedia, 2007).

The large impact of surface mining on the topography, vegetation, and water resources has made it highly controversial. There are issues of land degradation, loss of biodiversity and pollution of various forms. Surface mining can have adverse effects on surrounding surface and ground water if protection measures are not exercised. The result can be unnaturally high concentrations of some chemical elements, notably arsenic and sulfuric acid, over a significantly large area of surface or subsurface (Wikipedia, 2007).

Underground Mining

Underground mining is done when the rocks, minerals or gemstones are too far underground to get out with surface mining. Some examples of underground mining are borehole mining, draft mining, hard rock mining, shaft mining and slope mining (Wikipedia, 2007). Shaft mining is the deepest form of underground mining. The shaft mine has a vertical man-shaft, a tunnel where the men (miners) travel up and down in an elevator. Equipments are taken into the mine using the shaft too. When the ore is dynamited and broken into chunks, it is taken to the top and loaded into trucks through a second shaft for subsequent extraction (Wikipedia, 2007).

Environmental issues can include erosion, formation of sinkholes, loss of biodiversity, and contamination of ground waters and surface water by chemicals from the mining process and products (Wikipedia, 2007). For instance, use of heavy machines and chemicals underground do not only cause instability within the earth crust but also underground water which serves as source of water to various water bodies in the area are affected by infiltration of toxic materials. Noise and vibrations are also associated with underground mining.

Statement of the problem

The variety of mineral resources and mining dates back well into the pre-colonial times. However, since the inception of the Mineral Sector Reforms there has been a considerable increase in mining activities, particularly gold (Awudi, 2002). Production of gold is dominated by homegrown which produced nearly half of total gold output. From its mining operations in Goldmines It is both surface and underground mine. The surface mining method involves removing the top soil up to the bedrock, which bears the gold. Heavy machines are used for this purpose. Concessions are therefore made bare and devoid of vegetation. The

use of heavy machines and chemicals underground do not only cause instability within the earth crust but also underground water which serves as source of water to various water bodies in the area are affected by infiltration of toxic materials.

In addition, dynamite is used to blast the large rocks to aid excavation of the area where gold is extracted. The loud noise and the vibrations from the blasts have affected people within the surrounding communities very much. Buildings of the indigenes have cracked whereas those very close to the mining sites suffer much from breaking of glasses and other glass wares in their homes. Added to this is the shock being experienced by the in habitants Cyanide (potassium cyanide), a poisonous chemical, is used to recover gold from the ore, and in the process some spillages occur resulting in drainage (of cyanide) into the nearby streams. This causes aquatic life loss, as these chemicals are highly toxic.

It also seeps down into the soil causing plant roots to die. This resulted in the spillage of tailings materials into the external environment, thereby, affecting surrounding downstream communities. Undoubtedly, it is evident that streams and rivers where these chemicals and toxic materials drain into serve the villages and towns along them. Consequently, their drinking water is poisoned, causing morbidity and mortality conditions among residents. This was one of the indirect effects of the mining activities.

These environmental and health effects of mining activities have been attracting attention recently, hence, need to be addressed. Although, the mining company is believed to have made steps to improve health conditions of residents within the surrounding communities, however, the extent to which these efforts are reducing the negative environmental and health impacts is yet to be established. For instance, the claims to have put in place an effective environmental policy and strategy which is overseen by the Board Committee on Safety, Health and Sustainable Development.

In addition, there is the cyanide management policy that is being implemented in line with. Environmental Impact Assessment (EIA) of the company as well as its Environmental Management Plan. Notwithstanding these, the public is yet to acknowledge the extent to which these stakeholder organizations are contributing to the reduction of adverse health effects of mining. Environmental and health issues relating to mining activities are matters of concern within the public domain.

The mines corporate social responsibility towards sustainable alternative livelihood to affected communities in partly in response to the health problems arising from mining activities in the country. The Chamber of Mines, on its part has therefore, sought to order all of its members to embark on Sustainable Alternative Livelihood Programme (S.A.L.P.). In spite of the above, a detailed research into the current environmental and health impacts (both positive and negative) of Goldmines, one of the main areas of operation by the surrounding communities, is therefore a necessity.

Objectives of the study
Accordingly, the main objective of the study was to ascertain the environmental and health impacts of Goldmines on the surrounding communities.

The specific objectives were to:
- Examine the methods of mining operations and their effects on the environment.
- Determine the diseases prevalent in the surrounding communities resulting from the mining activities.
- Find out the effects of mining on farming (food production) activities within the Municipality.
- Determine and examine the interventional measures of goldmines in ensuring the safety of residents in the surrounding communities.
- Assess the role of the Chamber of Mines, Ghana Minerals Commission and the Environmental Protection Agency in regulating the activities of the Mining Company.
- Make recommendations and point out policy directives which can be implemented to ensure better health conditions for residents in the surrounding communities.

Hypotheses
Appreciation of mining effects on the environment by residents is related to their number of years of stay in the communities. Knowledge of mining effects on health is positively related to years of schooling (education). The rate of infection of malaria and respiratory tract infections among residents is inversely related to distance from the mines.

Justification and significance of the study
Mining activities are indispensable in the economic development of any country endowed with mineral resources. This is due to the economic benefits that are made available to countries that are involved in the extraction of mineral resources, both internal and external. Internally, there is the creation of employment and revenue generation. Externally, a substantial foreign exchange is available to such countries. Acknowledging the economic contributions of mining, however, several economies lost sight of environmental and health effects associated with mining activities. Researches that have been undertaken lately to look into the environmental and health effects of mining have found mining activities to be more hazardous to economic development than a blessing. Accordingly, several mining companies in the country claim to have responded to this by instituting and implementing several measures to reduce the negative environmental and health effects of their activities on the people. Whether some of these measures have or are capable of reducing the negative health impacts of mining on the environment and surrounding communities is a matter of great concern.

The significance of this research work lies in the fact that it seeks to undertake a thorough and broader outlook into the environmental and health effects of mining on surrounding communities, both negative and positive, and recommend policy directives to improve, as well as reducing the rate of hazardous health effects of the mining activities that may be identified in other surrounding towns. Findings and recommendations will serve as guide to other mining companies in the country.

Summary
Environmental effects such as land degradation and pollution of various forms (that is, air, water and noise) in the surrounding communities of mines are associated with both surface and underground mining as well as the method of gold extraction Land degradation has resulted mainly from surface (open pit) mining. Air pollution has emanated from emission of dust and other particles into the air, emission of chemicals such as carbon, sulphur, arsenic from processing plants and waste disposed of into tailings dams. Noise and vibrations are essentially the effects of blasting of rocks with explosives from both surface and underground mines. Water pollution has resulted from intoxication of water bodies with chemicals such as cyanide, arsenic and other suspended particles. As a result, water resources within the communities are not in a very good state as most of them have either been contaminated with toxic chemicals or polluted with waste from mining activities. Water quality tests conducted on major streams, rivers showed high concentrations of chemicals such as arsenic that were above WHO acceptable levels. These have had adverse effects on food production in the municipality as most lands have either degraded due to loss of nutrients or reserved for mining activities, resulting in a significant reduction in yield of major crops. Evidently, the proportion of farmers in the municipality has reduced drastically due to shift (of labour) to the mining and commerce sectors, hence the situation.

Conclusion
In as much as we acknowledge the economic benefits of mining activities, there is the need also to recognize the environmental and health hazards that come with it in order to find ways

of dealing with them. This was the main focus of the research. After a thorough investigation into the problem as pertains and its surroundings, the area of operation of Gold mining Company limited, it has come to light that mining activities have resulted in land degradation leading to limited land available for local food production within the municipality. There is also incidence of pollution of varied kinds (that is, air, noise and water) to the environment. Water pollution has affected mainly water resources within the area. All of the major streams and rivers in the area have been polluted by mining activities. The combined effects of above problems have culminated into health problems with high prevalence of diseases such as malaria, respiratory tract infections and skin diseases endemic in the area. Other nutrition deficiency related diseases such as anaemia and hypertension are also prevalent in the area. These were seen as the indirect effects of mining activities on food production in the area. These diseases, according to medical experts, form part of the notable causes of deaths (mortality) in the municipality. In view of the above problems, it has been recommended that Environmental Management Department revises its environmental management policy to ensure that the environmental effects of mining activities in the area are reduced to the barest minimum. Even though the Company has adopted measures such as re-afforestation, providing alternative sources of drinking water, reviewing operation methods and resettlement of affected communities, this initiative is essential.

The quantitative methods are difficult to use in social researches hence should be limited to natural and physical sciences. It is recommended that further researches are conducted into the assessment of intervention measures adopted and implemented by mining companies and stakeholder organizations in reducing as well as mitigating the economic, social, and environmental and health impacts of mining activities on the people in the surrounding communities. There should also be funding from the government and other institutions for researches conducted at higher institutions, with a move to educate the general public on the need to provide information needed for academic researches since they will ultimately lead to the development of the country

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