

## A Study of the Effects of Mining Activities on the Health Status of People: A Case Study

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**Abstract:** Mining activities began many years ago with small scale mining. Over the years, many corporate organizations have invested in exploring minerals in the country. Very huge returns have been achieved by such companies. The onset of mining activities bring along several issues, both negative and positive, relating to the environment, health and economic situation of the host community. The purpose of this paper is to identify the effects of mining activities on health status of miners and their host communities in Ghana. The research has revealed that although malaria existed before mining operations began, the current rate of infection is quite alarming and on the increase. Other forms of health effects were identified as skin diseases, upper/acute respiratory tract infections and cholera.

**Key words:** Community, disease, environment, health, malaria, mining

### INTRODUCTION

There is the need to undertake economic activities in order to make ends meet. All over the world, man takes advantage of the rich natural resources in the environment to achieve this target. Although some of these resources are usually accessible, there is often the need to reach some at their sources, be it underground (earth's crust) or in the sea. There are several ways of harnessing these resources in their raw state. One of such ways is mining (Boshkov, 2008).

Worldwide, mining is considered a very lucrative business and countries with large mines earn high foreign exchange from the export of minerals such as bauxite, diamond and gold. Statistics show that in some countries, it is their major source of foreign exchange. Ghana is known historically for its gold mines, and the country is one of the world's top gold producers. Ghana mined 60,000 kg (132,280 lb) of gold in 2004.

The Asutifi District in the Brong Ahafo region of Ghana was in 2004, exposed to mining activities in commercial quantities by Newmont Ghana Gold Limited (NGGL). The Company uses the surface mining method of extraction. Although mining is financially yielding, the method of extraction has a myriad of implications and effects (Owusu-Ansah, 2008). This study is basically to identify or look at those effects of mining activities on the health status of people of Ntotroso in the Asutifi District.

Health is defined as the state of complete mental, physical and social well-being and not merely the absence

of disease or infirmity (WHO, 2003). This definition implies that health is very essential in the life of all humans, without which it becomes difficult to function as one is not whole. Health provides longevity, energy and life, therefore every nation aspires for a society which is healthy. It is therefore important to look into the issue of how activities such as mining in the Asutifi District of the Brong Ahafo region are either making residents healthy or otherwise.

### MATERIALS AND METHODS

Questionnaires were prepared to aid in primary data collection. The questionnaires were personally administered to heads of households, based on the selected sample size to obtain accurate information. Interview guides were also used to collect information from institutions which are stakeholders such as the District Health Directorate.

**Sampling technique:** The technique adopted for sampling is such that the area under study, which is Ntotroso, was divided into four sectors of south, north, east and west. Each of the sections received an equal number of questionnaires to have a general overview of what happens in Ntotroso. A total of 100 household heads were interviewed with the aid of questionnaires. For institutions, three of them, namely, the Asutifi District Health Directorate; Newmont Ghana Gold Limited; and Kenyasi/Gyedu Health Center were consulted to gather information by means of interview guides.

**Analysis and collation:** All data collected was collated and analyzed by means of the Statistical Package for Social Scientists (SPSS). Data that came in the form of prose or answers to open-ended questions was also analyzed. The structure adopted for data collected was presented mostly in the form of tables and figures.

**RESULTS AND DISCUSSION**

This section briefly highlights the existing situations and conditions at Ntotroso, a mining community in the Brong Ahafo Region of Ghana.

**Immigration:** Within the past four years, 30% of household heads are reported as having people who have migrated from various parts of the country to the mining areas, and Ntotroso is no exception. Table 1 and 2 show the rate and the origin of emigration in Ntotroso respectively.

With the onset of mine operations there has been about 30% of the total number of households who had friends and relations coming to settle or reside with them, mostly to find employment with the mining company. 43% of the immigrants come from areas within the district while the rest, come from areas such as Kumasi, Accra and Sunyani. Others have also come to rent houses as they are employees of the mining company.

Gradually, the population is growing and thus putting pressure on amenities such as public toilet facilities and boreholes. This situation poses an immense danger to the health status of the people. There must however, be a look out for commercial sex workers and other social deviants.

**Room occupancy:** It was realized that the average number of people per room is 4%, as against the district room occupancy rate of 2.4% and national rate of 3.0%.

**Water and sanitation:** Water and sanitation are two things that can hardly be separated from life in any settlement. In Ntotroso, the issue of water and sanitation are not the best. This is because there are only three (3) boreholes and one public toilet facility. Disposal of refuse is mainly done by burning. Planning standards specify that one borehole serves three hundred people; thus three boreholes in the community serve nine hundred people, while the total number of people largely exceeds nine hundred. This situation therefore has led to excessive pressure on the boreholes. With sanitation, the only public toilet serves the entire population. The Water and Sanitation (WatSan) committee which was set up to ensure that the facility is well kept is no longer operational. This situation leads to various kinds of diseases ranging from malaria to diarrhoea.

**Health status of people in mining communities:** It was revealed from the field survey that the dominant

Table 1: Rate of Immigration

	Frequency	%	Cumulative%
Yes	30	30	30
No	70	70	100
Total	100	100	

Table 2: Origin of Immigrants

	Frequency	%	Cumulative %
Within district	13	43.3	43.3
Outside district	17	56.7	100
Total	30	100	

Table 3: Diseases found in Ntotroso

Diseases	Cases
Malaria	71
Skin disease	42
Respiratory tract infection	52
Urinary tract infection	26
Cholera	51
Cold/Cough/Catarrh	63
Pneumonia	37
Buruli Ulcer	15
STDs	50
Others	5

household sickness or disease in the community is malaria. This contributes to 71% of all sicknesses experienced by households. Respiratory tract infection accounts for 52% of diseases in the community. Nonetheless, there are others who also suffer from more than one disease. Other cases include sicknesses ranging from stomach-ache to rheumatism and headache (Table 3).

As shown above in Table 3, it came to light that the diseases that were largely suffered from the district were in order of occurrence, malaria; cough and catarrh; upper respiratory tract infection; cholera; Sexually Transmitted Diseases (STDs); skin disease; pneumonia; urinary tract infection and buruli ulcer. Others include headache, stomach-ache and rheumatism.

The onset and aggravation of these diseases are strongly attributed to the mining activities in the community. Dust suspension particularly mentioned as the cause of cough and cold; malaria is blamed on the pits of the surface mining activity, stagnant water from the mining activities and rain fills the pits and serve as breeding grounds for mosquitoes. Kaakpema (2004) also mentioned these conditions as prevailing in the diamond mining town of Akwatia in the Eastern region of Ghana.

For Sexually Transmitted Diseases (STDs), residents of Ntotroso emphasized that so far as there were several migrants trooping in, the STDs would continue to spread since they suspect that the migrants come in with the disease to affect others. There is also the issue of miners having left their wives and staying alone. The desire to satisfy one's sexual urge thus inevitably pushes them to engage in the sexual act (sometimes unprotected) and these results in the transmission of diseases.

This fact is not different in relation to what happens in other mining areas in Australia, where large infections are recorded in the mining rich states (Australian Federation of AIDS, 2008). The District Health Directorate (DHD) also gives the prevalence rates of HIV/AIDS (based on blood donors) in the entire district as shown in Fig. 1.

This implies that, as many people are weakened by these diseases, they cannot work, thus affecting their already deteriorating economic situation. The economic situation is said to be deteriorating because the people complained that their means of livelihood (farming activities) have been taken from them making it difficult for them to make ends meet.

**Assessing health care:** Registering with the National Health Insurance Scheme (NHIS) is yet to take a 100 percent hold in the community. The situation is such that as high as 42% of household heads have not registered with the Scheme (Fig. 2). About 7% of the 42% have however registered their children who are above eighteen years. This therefore implies that for the children who are below eighteen years whose parents have not registered is not covered by the Scheme. The reason for not registering is basically because they claim that they hardly experience any ailments in their bodies.

The implication of this attitude is that, if at any point in time such people and/or their children should fall sick and not have enough funds to access medical care, they can easily enter the critical stage where it may be too late for treatment and thus, result in death. Out of the 58% of people who have registered with the National Health Insurance Scheme, 11.6% claim it is not beneficial because they have not yet received their cards since they registered about six months ago.

**Effect of mining activities on the health status of the people:** For most residents of Ntotroso, the activities of Newmont Ghana Gold Ltd., have had an effect on their lives. The rest of the people assert that there has not been any effect on their lives. According to the latter, before mining operations began, life was going on quite well in the community and that there has hardly been any change in their lives (Fig. 3).

18% of the former, however, are certain of a positive effect on their lives (with respect to livelihood). An alarming 36% talk of a negative effect in terms of finances, health and the environment, 22% are also of the view that although employment and income are being generated from the location of the mining Company in the community, negative effects in the area of health and pollution have also been endured.

On the effect of mining activities on health and the environment, responses were skewed toward the issue of negative effect on health. 98% of the residents were

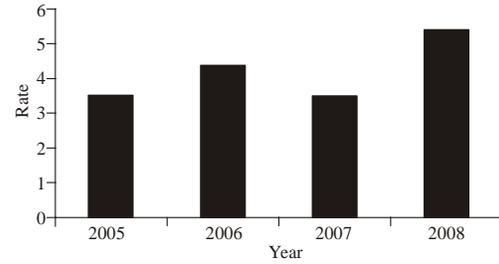


Fig. 1: Rates of HIV/AIDS (based on blood donors)

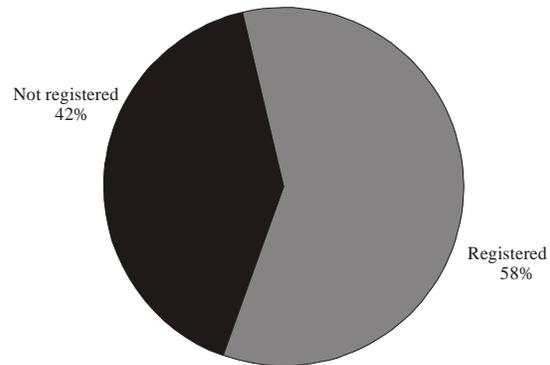


Fig. 2: Health care assessment based on registration

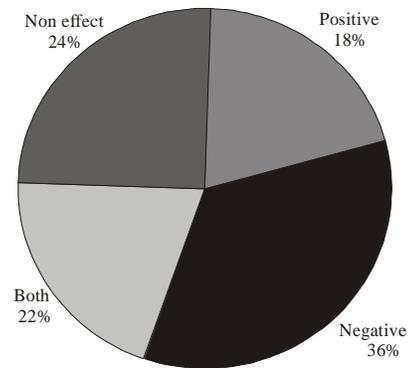


Fig. 3: Views on mining activities

disturbed about not being able to drink rain water anymore since the mining operations began. For the people, it is a matter which goes beyond health and the environment, but also breaks the tradition of consuming rainwater since time immemorial. Table 4 presents the top ten diseases before the commencement of the mining activities.

Being a mining community, it is important to analyse the diseases in relation to which of them are mining related. Referring to Table 5, the top ten diseases in the community for the past three years has alternated from malaria, acute/upper respiratory tract infections, skin disease, dysentery, rheumatism, eye infections and diarrhoea.

Table 4: Top nine diseases before the commencement of mining operations (2002 To 2004)

2002		2003		2004	
Disease	Cases	Disease	Cases	Disease	Cases
Malaria	1444	Malaria	1603	Malaria	1801
ARI/URTI	755	ARI/URTI	756	ARI/URTI	896
Skin disease	406	Skin disease	433	Skin disease	556
Intestinal worms	301	Intestinal worms	350	Intestinal worms	428
Hypertension	182	Hypertension	173	Hypertension	183
Rheumatism	107	Rheumatism	121	Rheumatism	119
Eye infection	124	Eye infections	130	Eye infection	133
Diarrhoea	143	Diarrhoea	156	Diarrhoea	154
Dysentery	94	Dysentery	92	Dysentery	101

Table 5: Top nine diseases (2005 to 2008)

2005		2006		2007		2008	
Disease	Cases	Disease	Cases	Disease	Cases	Disease	Cases
Malaria	4270	Malaria	6277	Malaria	9194	Malaria	12437
ARI/URTI	1106	ARI/URTI	1366	ARI/URTI	1782	ARI/URTI	3790
Skin disease	791	Skin disease	993	Skin disease	1044	Skin disease	1731
Intestinal worms	619	Intestinal worms	775	Intestinal worms	865	Intestinal worms	2492
Hypertension	257	Hypertension	382	Hypertension	360	Hypertension	553
Rheumatism	234	Rheumatism	340	Rheumatism	570	Rheumatism	823
Eye infection	137	Eye infection	162	Eye infections	333	Eye infection	483
Diarrhoea	216	Diarrhoea	256	Diarrhoea	259	Diarrhoea	343
Dysentery	141	Dysentery	160	Dysentery	207	Dysentery	527

From Fig. 4 and 5, it can also be seen that the number of people affected by a particular ailment increases at an increasing rate. For example, before the commencement of mining activities, the rates of disease infections were minimal compared to the period when mining started.

Between the years 2005 to 2008, there has been a sharp increase in the rate of disease infection during the commencement of mining activities than before (Fig. 4 and 5).

It is a known fact that in mining areas, one of the major diseases that can be found is malaria. It is therefore not surprising that in the community under consideration, malaria cases keep rising from year to year. The major cause of this condition as asserted by community members is the fact that the mine operates a surface mine and thus mosquitoes that settle around dumpsites easily travel to the communities to cause havoc in the community.

Dust generated and spread in the course of mine operations, when inhaled also causes the condition of acute/upper respiratory tract infections. The road from Kenyasi to Ntotroso (both mining towns) is covered in large amounts of dust and residents of these communities have their houses positioned right by the road sides. This condition is hazardous to health since vehicles travel on the road at a very frequent rate than it was before mining operations began.

Current preventive and curative measures in place: According to the Director of health, many of the diseases that people suffer from in the district existed before mine operations began. The difference now is that there has been an increase in the number of cases reported. This is

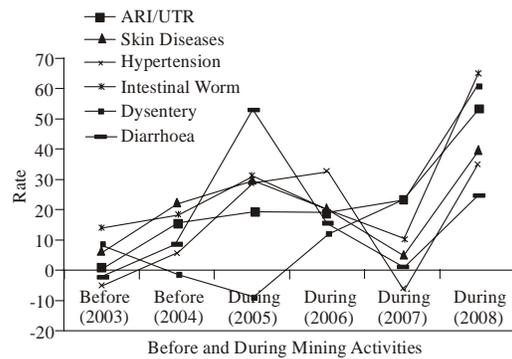


Fig. 4: Top diseases from 2005-2008

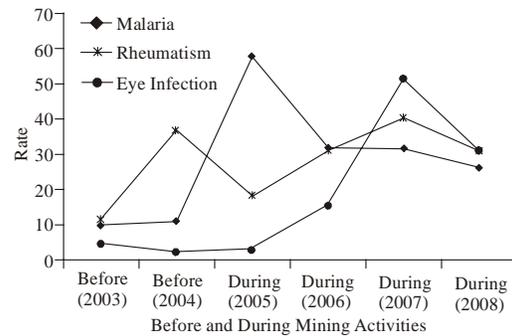


Fig. 5: Top diseases from 2005-2008

especially so in the area of Sexually Transmitted Diseases (STDs) with regards to Human Immuno-deficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS).

Due to the indirect relation of diseases to mining activities, there is presently no partnership however with Newmont Ghana Gold Limited (NGGL) to curb diseases and its resultant effects. The district only does what it can by training Volunteers (under the Community Based Volunteer Programme-CBVP) who go into communities to educate citizens about healthy living as a disease preventive measure. Health facilities in the district practice more of curative measures which do well in treating ailments. The package for curative treatment includes a 24 h-7days health service, operation of the Community of Health Planning Services (CHPS) compound and limited laboratory services. It is therefore evident that the extent of preventive measures has not far advanced as in the case of curative measures.

Disease preventive measures as instituted by Newmont Ghana Gold Limited include proper management of waste from the mine as dictated by the International Council on Mining and Metals (ICMM). Newmont is a founding member of ICMM and as such, the company will adhere to ICMM's principles for sustainable development throughout of the project.

Newmont, as a signatory to the International Cyanide Management Code (ICMC) has sensitized the community members against the action of drinking rainwater, especially after a blasting has occurred, since harmful chemicals could be in the atmosphere and consuming such water could be disastrous. For its staff, however, NGGL also provides free condoms and organises periodic workshops to educate them on health issues.

Future of mining activities on health: On future of the district in terms of the effect of mining operations on health status, the District Directorate of Health anticipates an increase in HIV infections, malaria and buruli ulcer, especially in the mining communities. This view is shared by citizens and residents of Ntotroso as represented by the views of respondents of the survey conducted (Table 6). This will happen especially if no effective measures are put in place.

Asking about the future of healthcare or health status in the community, residents are adamant about the fact that the situation will be worse off than it is presently. 87% of the people assert that more people will fall sick; especially since mine operations will continue for a long time. Already, with the few years of mine operations, there is complaint of a swell in the number of diseases related to mining activities such as malaria and skin diseases.

The influx of emigrants also poses a threat to health in the area of diseases. HIV/AIDS which used to be unheard of in the community has begun to gain grounds. There is also the issue of overcrowding as family and friends move into the community to seek employment. It is a known fact that overcrowding has negative medical implications and causes the easy spread of diseases such as cough and other airborne diseases.

Table 6: Future of health care/status in the community more people will fall sick as far as mining operations exist

	Frequency	%	Cumulative (%)
Yes	87	87	87
No	13	13	100
Total	100	100	

## CONCLUSION

After successfully analysing the current situation in the mining community of Ntotroso in terms of health and environment, the following are the findings that were made evident:

- About 30% of households have emigrants who have come to stay in the community to seek employment.
- The effect of mining activity on the people of Ntotroso is largely negative 78% in terms of health, environment and finance. Respiratory diseases (resulting from dust suspension and inhalation of chemicals in the atmosphere) are key among the immediate effects on health.
- Malaria is the major ailment experienced or suffered in the mining community of Ntotroso.
- The rate of disease infection is on the increase from year to year. This is especially true with malaria and sexually transmitted diseases.
- Though the diseases cannot be directly linked to mining activities at this relatively early stage of mining operations, proof from other mining communities in Ghana have shown that the increase in the incidence of diseases in the past four years have a linkage to mining activities.
- Traces of buruli ulcer have been identified and reported for the first time in Ntotroso.
- The mining community of Ntotroso do not take keen interest in current health issues, as priority is given to matters concerning money and compensations.
- Newmont Ghana Gold Limited has not put in too much effort in curbing the effect of their activities on the people. Again, mitigative/curative measures in terms of sensitisation are totally neglected.
- In the health sector, curative means of disease treatment are promoted on a larger scale than preventive measures.
- The continual operation of the mining company in the community will definitely cause negative health implications, such as a rise in morbidity levels and a situation of food shortage may occur.

## RECOMMENDATION

The following are recommended:

- The community leaders, NGGL, District Health Directorate and health officials must all put their hands on deck and make a conscious effort to ensure

that all community members are periodically sensitized on pertinent health issues and diseases, especially those that result either directly or indirectly from mining activities.

- NGGL must embark on mass spraying exercises to destroy breeding grounds of mosquitoes and frequent community meetings must be held to discuss specific health issues, rather than concentrating only on economic activities. This is because, it is only when one is in good health that he/she can work effectively and efficiently.
- Frequent gathering of community members with health personnel to discuss issues relating to health and other harmful habits can be really helpful.
- More emphasis on feasible, practical and realistic preventive measures of curbing diseases should be put in place by the Health Directorate and other stakeholders so as to ensure that very few people fall sick and even if they do, resources spent on cure would be minimal.
- Good sanitation should be championed by community leaders. Frequent communal labour to clear filth and desilt choked gutters would go a long way to prevent contamination and prevalent diseases such as cholera and malaria.
- Responsible and respectable people must be put in charge of the only public toilet in the community and must be well kept.
- The directive of Newmont Ghana Gold Limited (NGGL) concerning not consuming the drinking of rainwater must be adhered to.
- Personal hygiene and good nutrition should also be encouraged. As mentioned by some residents, this is the way by which they avoid sickness.
- The use of treated mosquito nets must be encouraged as much as possible, especially for children, expectant and nursing mothers. NGGL, health officials and community leaders can negotiate to freely give out treated mosquito nets or provide the nets at reduced prices that will be affordable and financially accessible.
- Social responsibility of NGGL to the people in the area of health must be fulfilled.

- The road from Ntotroso to Kenyasi, running through the NGGL main plant site must be tarred by NGGL to prevent dust particles from causing diseases such as catarrh, cough and common cold. The current method of spraying the road with water is not too effective as residents complain of the effect of dust generated when vehicles pass on the road, especially in the dry season.
- Waste of NGGL should be well managed to prevent contamination of the environment and groundwater water sources.
- Preventive measures given by health personnel at the health centres should move from the consulting rooms and be extended to the community at large. This should be done on a frequent basis.
- Voluntary testing exercises can be organized to ensure that any diseases lurking in the bloodstream can be detected early in order to prevent any fatal situation.

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