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Left to their Fate? Effects of Mining on the Environment and Wellbeing of Residents in the Asutifi District, Ghana

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Abstract
Ghana experienced rapid liberalisation in the mining sector in the 1980s and 90s which led to the intensification of mining activities across mining zones in the country. This study therefore examined how operations of Newmont Ghana Gold Limited (NGGL) affect environmental justice in the Asutifi District. Using questionnaires, in-depth interview guides and observation checklist, data for the study were gathered from 217 randomly selected household respondents and 10 purposively selected key stakeholders. The results revealed widespread environmental injustices caused by mining that infringe on the rights of the residents of Asutifi District to live in safe and healthy environment they are entitled to. The paper recommends the application of international best practices by Newmont to reduce the adverse impacts of its activities on the environment and wellbeing of residents, and a revision of existing legislations on mining in Ghana in order to safeguard the wellbeing of communities affected by mining operations.
Keywords: Mining, environmental justice, mining-fringe communities, stakeholders.

1. Introduction

Ghana's mineral potential and the country's contribution to global minerals output, especially gold is well acknowledged. Indeed, it has been recognised that the mining sector is an important segment of the Ghanaian economy and has played a significant role in the country's socio-economic development since the colonial period (Akabzaa, 2009). The country's colonial name-Gold Coast-reflects the dominance and importance of the mining sector to the economy (Akabzaa & Darimani, 2001). Since 1983, when Ghana undertook various economic policies such as Economic Recovery Programme (ERP) and Structural Adjustment Programme (SAP), there has been a considerable rise in investment and increase in the mining sector especially in the gold sector (Hutchful, 2002). The number of mines and exploration companies increased considerably as a result of generous incentives offered by government to investors.

The contribution of the mining sector to Ghana's foreign exchange earnings and the sector's attraction of foreign direct investments to the development of Ghana have been phenomenal. At the later part of 1990s the mining sector received substantial funds (US$3 billion) from foreign direct investment to support the development agenda of Ghana (Institute for Statistical Social and Economic Research (ISSER, 2006). More than 120 accredited local and foreign mining companies operate in Ghana with several operating mines mainly in the Gold sub-sector which account for more than 30 per cent of the country's foreign exchange earnings (Minerals Commission, 2011). Notwithstanding the rise in mining activities and its contribution to Ghana's foreign exchange, it is not clear the kind of benefits that mining communities and ordinary citizens of Ghana derive from mining.

It has been argued that a thorough cost/benefit analysis of the effects of the mining sector to the ordinary Ghanaian will provide a negative result (Darimani, 2009; Akabzaa & Darimani, 2001). Factors such as the high level of fiscal incentives enjoyed by mining companies and the high level of foreign exchange earnings mining companies are allowed to retain in offshore accounts have been pointed out as the probable factors that might cause such negative benefits (Yankson, 2009; Akabzaa & Darimani, 2001). The negative environmental impact of mining, the growing redundancies associated with the privatisation of state-owned mining companies, the growing incidence of conflicts between mining communities and their chiefs on one hand and mining companies on the other hand are other factors that have been raised not allow the residents of Ghana to get much benefits from the mining sector (Akabzaa & Darimani, 2001).

The World Bank Group and IMF, in particular, have been critical in Ghana's policy shift from state intervention in the economy to a system that has allowed market forces to determine resource allocation

(Hutchful, 2002). This is indeed the thrust of the structural adjustment programme that Ghana embarked upon in the 1980s to ensure the reorientation of development policies that consigned the state to provide an enabling environment for market driven and private enterprises-led economic growth (Akabzaa, 2009). Such development polices have paid little or no attention to environmental management strategies. Indeed, the conditionality of structural adjustment lending that included trade and exchange rate reforms, review of national investment priorities, privatization of public-sector enterprises, and fiscal policy reforms as asserted by Songsore (2003), only sought to provide license to multi-national mining companies to extract mineral resources in Ghana without due regard to the protection of the environment.

In 2002, Newmont Ghana Gold Limited (NGGL), a gold mining company began full time operations of its Ahafo Mines in the Asutifi District which is one of the deprived districts in the Brong Ahafo Region of Ghana where problems such as limited access to educational infrastructure, health facilities, pipe-borne water and poor road networks are profound (Abane, 2008; Ghana Statistical Service, 2008). The Asutifi District is one particular rural area in the Brong Ahafo Region of Ghana where waste generated through the operations of Newmont Ghana Gold Limited is found to be causing many environmental hazards (Environmental Protection Agency, 2011). The company employs the open cast method in its operations and currently operates five open pits whiles developing three others that are expected to be in operation by 2014 (Newmont Ghana Gold Limited, 2012).

Despite the adverse effects that mining pose to the Asutifi District little has been done on mining and environmental justice (right to live in a clean and safe environment) in the area. This paper is an attempt to bridge this gab. The objective of the paper is to assess how mining infringe on the right of the dwellers of Assutifi District to live in a clean and safe environment that they are entitled to. The outcome of the paper will provide good lessons to other mining fringe communities elsewhere to take informed decisions to protect the well-being of their residents. The rest of the paper is structured as follows. The next section is focus on theoretical underpinnings of environment and environmental justice. Section three looks at the methods and data used. Section four presents the results and discusses the key findings as informed by the literature. The final section of the paper provides conclusion and the way forward to protect the rights of residents of mining-fringe communities in the Asutifi District to live in clean and safe environment.

2. The Concept of Environment and Environmental Justice

In general, environment connotes a place where people live, work or play. It has been conceptualised to have four main components which are natural, built, social and cultural environments (Girling, 2005). These four components therefore have to be in good condition if a healthy and sustainable environment is to be achieved. Several factors have been found to undermine the quality of the environment. A report by the National Environmental Justice Advisory Council as cited in Adjei Mensah et al. (2013) highlights the following factors to contribute to the deterioration of the quality of the environment:

> (a) co-existence of residential and industrial sites as a result of bad land use planning; (b) an oversaturation of communities with multiple sources of environmental pollution in highly congested spaces; (c) inadequate documentation of most environmental health risks in communities; (d) lack of a comprehensive environmental enforcement and compliance activity which results, for some communities, in a virtual non-existence of such activity; (e) lack of health services and adequate information on environmental risks; (f) severe decay in the institutional infrastructure; and (g) a high rate of social alienation and decay caused by living in degraded physical environments (p.4).

These factors and others indicate that most aspects of the environment particularly the natural and built environment which constitute the physical environment are in the state of jeopardy, signifying that most people are living in unhealthy environmental conditions (Adjei Mensah et al., 2013). The concept of environmental justice emerged in the 1980s as grass root social movements in the United States of America (USA) to address injustices in environmental problems especially on less privileged communities (Agyeman, 2007). The focus of the concept of environmental justice is to achieve fair treatment and involvement of all people irrespective of their colour, race, ethnicity and socio-economic status in addressing environmental problems such as pollution, degradation and waste management problems (Brulle & Pellow, 2006). The United Nations (UN), World Health Organization, the Environmental Protection Agency in USA and other international organisations have adopted this concept and stress on the need for individuals irrespective of their background to be treated fairly in all matters concerning environmental hazards.

The scope of environmental justice since its inception in the 1980s has expanded from its initial focus on toxic waste problems to include many issues that cut across social, economic and political facets of the world. For example, issues concerning the siting of waste facilities, lead contamination, sanitation, housing, transportation, resource location, extraction of resources, and community participation and empowerment which are now covered in Locally Unwanted Land Uses (LULUs) are now given much attention in the discourse of

environmental justice (Agyeman & Evans, 2004; Agyeman, Bullard & Evans, 2002; Bullard, 2001). With respect of space, the concept environmental justice was initially restricted to urban areas focusing on industrial waste management. However, in the mid-1990s, the concept began to find space in rural development studies as most of the extractive industries were located in and around remote rural settlements especially in Africa, Asia and Latin America. In particular, increased investments in mining, lumbering and oil and gas exploration and the attendant negative impacts on the environment and rural settlements (Boon & Ababio, 2009) called for studies into the activities of extractive industries on the built environment of rural areas across the globe.

Within the concept of environmental justice, political and distributive justices are often highlighted. The distributive justice focuses on equity in the distribution of environmental benefits and risks whilst the political justice on the other hand concern itself with fairness in decision making on the environment (Bullard, 2001). Kaswan (1997) opined that distributive justice helps to address disproportionate burden of environmental hazards that are often suffered by low-income or minority communities. He further stressed that political justice takes care of the unfair involvement of the poor or less privileged in the decision making process on environmental hazards. In the context of this paper, decisions about how to manage wastes emanating from the activities of the mining company without adequate involvement of mining-fringe communities, constitute political injustice. According to Agyeman and Evans (2004), the concept of environmental justice is underpinned by both procedural and substantive dimensions. Meaningful involvement of all people into decision making on the environment constitute the procedural dimension whilst the substantive aspect covers individual's the right to live in and enjoy a clean and healthy environment.

3. Methods and Data

The primary location for this study is the Asutifi District in the Brong-Ahafo Region of Ghana. It is located between latitudes 6°40' and 7°15' North and longitudes 2°15' and 2°45' West. Kenyasi, the district capital, is about 50km from Sunyani, the capital of the Brong Ahafo Region (ghanadistricts.com). The district shares boundaries with the Sunyani Municipality in the north, Tano South District to the north-east, Dormaa Municipality to the north-west, Asunafo North Municipality and Asunafo South District to the south-west and Ahafo Ano South and North districts (Ashanti Region) to the south-east (Figure 1). With a total land surface area of 1500 km^2, the district is one of the smallest in the Brong Ahafo Region.

In respect of development, the district is mainly rural and one of the most deprived districts in the Brong Ahafo Region (Ghana Statistical Service, 2008). About 31% of the people in the district live below the poverty line with 15% of them living under conditions of extreme poverty (ghanadistricts.com). Five communities in the District, namely Kenyasi No.1, Kenyasi No.2, Gyedu, Ntotoroso and Wamahinso were purposively selected for the study (Figure 1) because The activities of Newmont is profound in these communities and the company also operates five open pits that are located close to these communities.

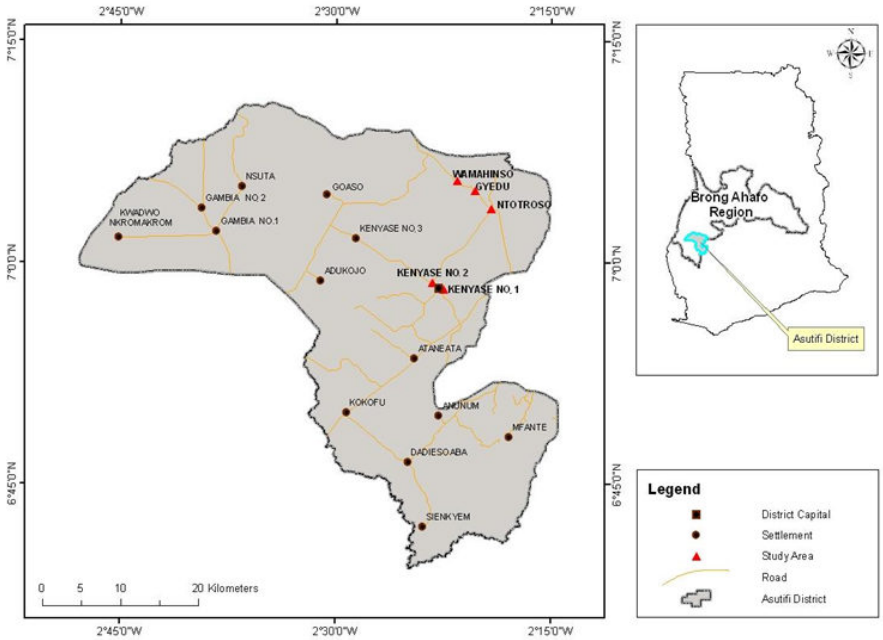

Figure 1: Map of the Asutifi District showing the study areas
Source: Cartographic Unit, Department of Geography and Regional Planning, UCC (2011)

The paper employed a cross-sectional design which involves the retrieving of data from study participants mostly from multiple groups at a defined point in time or relatively brief period of time (Olsen & George, 2004). Rich and varied data have been found to be provided by cross-sectional design since it utilises data from different participants (Mann, 2003). The residents in the five communities, management of Newmont Ghana Gold Limited, and regulators of the environment in the Asutifi District constitute the study population of the paper.

The research approach was a mixed method which involved triangulation of both quantitative and qualitative methods of data collection concurrently. Triangulation focuses on collecting and analysing both qualitative and quantitative data in a single study (Creswell, 2003). The application of multiple sources of evidence helped the paper to have a better understanding of the research problem by converging numeric trends from quantitative data and specific details from qualitative data (Mertens, 2003). Hence, both quantitative method (questionnaire), and qualitative methods (in-depth interview and observation) were used to collect data from the field. A sample of 217 household respondents was selected for the investigation. The sample size was obtained using the Fisher's formula which took into consideration the total number of people and households in the selected communities (Fisher et al., 1998). The household respondents were selected using the systemic sampling technique. A sample interval was calculated using the total number of houses in the five communities. Based on the sample interval for each community, respondents in the various housing units were selected for the study. Thus, after a random start, every housing unit that correspond with the sample interval for each community was selected. For houses with more than one household, the lottery method was applied to select one household. This procedure was done repeatedly until the sample assigned to each community was exhausted. The purposive sampling technique was used to select ten key informants; one representative each from the District Assembly, the Environmental Protection Agency (EPA), Forestry Commission, Newmont Ghana Gold Limited, and Livelihoods and Environment Ghana (LEG) an environmental NGO operating in the Asutifi District. In addition, one opinion leader was selected from each of the five communities for an in-depth interview. These respondents were selected on the basis of their level of expertise on issues that affect the environment, their contribution towards the development of mining-fringe communities and the role they play in protecting the populace from harmful activities of mining. Thus, the total sample size for the study was 227 respondents.

Both primary and secondary data were collected for the paper. Primary data were collected through the use questionnaires, observation and in-depth interview (IDI). The data basically focused on the background characteristics of residents, environmental problems affecting them as a result of the activities of Newmont and the role of regulators and stakeholders in ensuring environmental justice in the Asutifi District which the residents are entitled to. Personal observations on the physical environment of the study area were also undertaken to have first hand information on the ground. Secondary data relevant to the study were obtained from published books, journals, newspapers, articles, reports, the internet, as well as from conference and working papers. The questionnaires were processed and analysed using the Statistical Product for Service Solutions (SPSS) version 17. The qualitative data from the In-depth Interviews (IDIs) were manually analysed which involved transcribing the data, categorising the data under specific themes and using them to support discussions in the paper where appropriate. Digital photographs were taken to support the observation sessions. In all, the results of the paper were presented using frequencies, percentages, tables, exhibits from personal observations and direct quotations from the study participants.

4. Results and Discussion

This section of the paper presents the findings of the study. It is organised under four broad areas. These are the activities and waste management practices of Newmont; negative impacts of mining on the wellbeing of the residents, negative effects of mining on the environment, and lack of protection against environmental risks caused by mining.

4.1 Activities and Waste Management Practices of Newmont Ghana Gold Limited

The activities of mining companies, particularly large scale surface mines generate much waste on the environment. These wastes are either in a form of liquid or solid waste. In examining the waste generated by Newmont, the study initially sought to find out how the company conducts its operations specific to mining. In an interview with an official from Newmont, he described the mining operations of the company as follows:

> As you know already, we operate surface mines. We have five large open pits from which we obtain ore. This process is typically conducted as drilling, blasting, haulage of the ore to processing plant. At the plant, we do crushing and screening, agglomeration and stacking. Then lime (CaO) is applied to the ore to raise the pH to between 10.5 and 11.0. Sodium cyanide solution (NaCN) is then used for dissolution of the gold, a process usually referred to as cyainidation. Finally gold is recovered through electro-winning. Each stage in the process generates some form of waste but we have ways and means of managing such

wastes.

The above findings imply that several activities or process are carried out by Newmont to mine and produce gold. Each of these activities in one way or the other generated some form of waste onto the environment. Consequently, it was expedient to find out from the perspectives of residents living around the mines, how the various activities generate waste onto the environment. Table 1 shows the main activities of Newmont in the Asutifi District that generated waste onto the environment.

Table 1: Activities of Newmont that generate waste

Activity (process)	Frequency	Percent
Haulage of ore	86	40
Pit construction	52	24
Dissolution of gold	44	20
Blasting of rocks	20	9
Crushing of ore	10	5
Electro-wining/refining gold	5	2
Total	217	100

Source: Fieldwork, 2011

From the perspectives of residents living in the communities located closer to the mines, haulage of rocks (40%) was the dominant activity or processes of Newmont that generated waste. Perhaps this was the most visible of all the activities of mining in the locality. It was followed by pit constriction (24%) and dissolution of gold (20%). Personal observation made on the activities of the company corroborated the responses from the residents. It was observed that mountains of rock wastes were piled up on the edges of pits where drilling and blasting of rocks were on-going. The lands surrounding these pits had also been littered with rock wastes from the pits. Dusts emanating from the movement of haulage vehicles and other heavy duty equipments were dominant in the communities. In addition, smoke and fumes that came from vehicles and the processing plant also contributed to the gas generated from the activities of mining. It was observed that all the roads that linked the five pits to the processing plant not tarred. These roads passed through the five communities and so produced a lot of dusts when the haulage vehicles passed through them.

Chemicals used for processing ore into gold such as lime and cyanide as well as grease and oils from various activities in the mine formed a significant proportion of the liquid wastes generated by Newmont. These were confined to tailings dams located close to rivers and streams in the District. These findings follows similar observations made Akabzaa and Darimani (2001) in the Tarkwa Mining Region of Ghana, where the activities of several large scale mining companies have generated large volumes of solid, liquid and gaseous wastes onto the environment.

Mining companies around the world use different methods to dispose off wastes that are generated by their activities. Whiles some of the methods were appropriate, others have been found to be impacting negatively on the environment (Hilson & Nyame, 2006). To find out the form of waste management practices adopted by Newmont, an official of the company was asked to describe its waste management practices. In respect of industrial wastes, the official indicated that:

> The management of waste from this mine is done in accordance to approved environmental plans. The spent heap and waste rock heaps are stabilized and re-vegetated. Tailing slurries and cyanide are channelled into tailing dams that also are re-vegetated. We also have containment dams to contain water drawn from the pits. Each of the five pits has two containment dams around it. Reagent containers and packing materials are sold out to contractors who dispose them off. We also sell spent oil and grease to end-users.

However, the official indicated that the company had not put in place any effective method of managing gaseous wastes such as dusts, fumes and smoke that were generated by the haulage trucks, earth-moving equipment and the processing plant. On the management of domestic wastes, the official remarked:

> The Ahafo Project has a sewage and waste water treatment plant, which treats faecal matter before it is discharged. The plant uses the Activated Sludge Process, a biological treatment process, which reduces levels of organic waste matter and treats bacteria. Such plants are used throughout the world to manage sewage and wastewater. The facility produces safe effluent for discharge in the form of a clear water and sludge effluent. We have contractors charged with discharging the sludge into specially designated landfills far from human habitation. We burn papers and wood particles in incinerators. I must admit that monitoring of these contractors is poor and so on some few occasions; we were faced with some challenges where these contactors failed to properly manage these wastes generated by our workers.

It can be inferred from the above findings that management of the company has put in place various methods to manage liquid waste emanating from its activities. However, some of these methods were not appropriate. In particular, burning solid wastes in incinerators and depositing sludge into landfills can be regarded as a poor management practice even though it is the cheapest. As indicated in the waste management hierarchy, the cost of incineration and discharging wastes into landfills is cheaper compared to other methods such as recycling and reuse (Girling, 2005). The company thus preferred incineration and land filling as a way of reducing cost. As a large scale mining company that generate large volumes of waste, it was expected that recycling and re-use of waste should have been the most preferred methods of waste management, but this was not the case. The findings also reveal poor supervision on the part of Newmont in managing its wastes as some contractors procured to manage wastes on its behalf, failed to live up to expectation.

4.2 Negative Effects of Mining on the Wellbeing of Residents

In spite of the positive impacts such as infrastructural developments and creation of job opportunities that mining helps to offer, mining activities in the Asutifi District exposed the local population and in particular the poor, to serious risks to their health, security, well-being, as well as to the stability of their employment, income, and spending power (McMahon & Remy, 2001; Armstrong, 2008).Using a three point Likert scale, residents of the mining-fringe communities expressed their opinions on the adverse impacts of mining on their well being as indicated in Table 2.

Table 2: Perceived adverse impacts of mining on wellbeing of residents

	Level of agreement (%)			
Statements	A	U	D	TOTAL
Reduction in farmlands	94	1	5	100
Food insecurity	96	3	1	100
Pressure on existing infrastructure	84	5	12	100
High cost of living	94	2	5	100
Family disorganisation	83	6	12	100
Inadequate housing	78	8	14	100
Destruction of sources of water	82	11	9	100

{Agree; U= Undecided or uncertain; D= Disagree, N= 217

Source: Fieldwork, 2011

It can be realized from Table 2 that a significant proportion of the residents expressed strong agreement in respect of the adverse impacts of mining on their wellbeing. For example, For instance 94 percent of the respondents agreed that Newmont's operations have led to reduction in farmlands, against 1 percent that were undecided and 5 percent that disagreed. Again, 96 percent agreed that mining operations have resulted in food insecurity, compared with 3 percent and 1 percent that were uncertain and disagreed respectively. Considering the fact that more than sixty percent of the resident in these mining-communities were involved in farming (Asutifi District Assebly, 2010), the taking over of 2,426 hectares of farmlands (of which 1,965 hectares had been actively cropped) by Newmont implies a significant reduction in the natural asset (land) which is a key resource to rural residents, particularly farmers. Consequently, food insecurity was bound to occur due principally to reduction in farmlands and farm sizes mainly because Newmont's mine concession covers large tracks of lands that were originally used for farming. Notwithstanding the number of infrastructure projects undertaken by Newmont in the various communities, 84 percent of the respondents agreed that mining operations have resulted in pressure on physical infrastructure such as public toilets, health facilities and pipe-borne water. Akabzaa and Darimani (2001) had earlier intimated that the influx of people to mining-fringe communities in search of jobs and other opportunities that come along with the operation of large scale mines, increases the population of such communities and thus exerts pressure on the few existing physical infrastructure.

One of the known negative effects of mining is the high cost of living within communities near mine locations (Agbesinyale, 2003; Hilson & Nyame, 2006). More than 90 percent (94%) of the respondents attested to the above finding. A number of factors were identified as being responsible for the high cost of living in the study area. First, there was disparity in incomes, in favour of mining company staff as the salaries of the Ghanaian staff in the mines are indexed to the US dollar (Kotey & Adusei, 2009). This raises their income far above employees in other sectors. Likewise, the expatriate staffs of Newmont were paid internationally competitive salaries, which further widened the income disparities in area. Thus, this group of high-income earners has influenced the pricing of goods and services such as housing, food and other amenities. With lower incomes, the local people are out priced by employees of the mining company in the purchase of goods and services, a situation that increase the cost of living for residents in mining-fringe communities.

4.3 Negative Effects of Mining on the Environment

In line with the tenets of environmental justice, three point Likert scale was used to seek the views of the community respondents on the effects of Newmont's operations on the environment (Table 3).

Table 3: Negative effects of mining activities on the environment

	Level of agreement (%)			
Statements	A	U	D	TOTAL
Pollution of rivers/ streams by cyanide and effluents	85	6	9	100
Air pollution resulting from dust, smoke and fumes from mining operations	81	3	16	100
Land pollution from grease and oils from various activities	83	7	10	100
Cracks in buildings due to vibrations from blasting operations	85	8	7	100
Siltation of rivers and streams	77	13	10	100
Land degradation	92	2	6	100
Deforestation	84	5	11	100
Landscape destruction	91	4	5	100

{A= Agree; U= Undecided or uncertain; D= Disagree}, N= 217
Source: Fieldwork, 2011

The results in Table 3 imply a strong agreement on the part of residents of the five communities that the activities of Newmont have had widespread negative consequences on the environment. A significant proportion of the residents agreed that water, air and land pollution was a key consequence of Newmont's operations on the environment. For instance 85 percent of the respondents agreed that Newmont's operations have led to pollution of rivers with cyanide and effluents, against 6 percent that were undecided and 9 percent that disagreed. Similarly, 81 percent agreed to air pollution resulting from various activities from the mines.

Indeed, substantial evidence has been collated concerning the detrimental effects of Newmont's activities on local water systems in the study area (Armstrong, 2008). Of major concern is the mismanagement of cyanide and faecal matter which have led to the contamination of freshwater resources and soils. For example, in February 2010, Newmont was found guilty by a Ministerial Investigative Committee and was ordered to pay GH¢7 million to the Government of Ghana for negligently discharging cyanide into the Subri River in the Asutifi District (Ghana News Agency, 2010). Earlier in December, 2003, the company had been found guilty by the Environmental Protection Agency (EPA) for discharging faecal matter from its Sewerage Treatment Plant to the River Asuopre that serves downstream communities like Kwakyekrom, Ntotroso and Kenyase No.1 and No.2 (Wassa Association of Communities Affected by Mining [WACAM], 2008). Per its activities, Newmont is worsening the water stress situation and also creating public health problems for the people in the area. Indeed, the adverse impacts of such discharge on local fish and wildlife populations as well as the health and livelihoods of rural farming and indigenous communities is a matter of concern.

Respondents also expressed concern about land degradation, deforestation and alteration of the landscape of the area as a result of Newmont's mining operations. As indicated in Table 2, 84 percent of the respondents agreed that the operations of Newmont have resulted in deforestation. Field observations revealed that one of the five open pits of Newmont was located in the Bosomkese Forest Reserve, near Ntotroso. It was realised that some trees have been cut down to make way for the construction of the pit and subsequent transportation of mineral ore to the processing plant. Thus, even though the forest was a reserved one, the company had gone ahead to conduct mining operations in it, a practice that goes contrary to the laws on mining in Ghana. An interview with an official of an environmental NGO confirmed this:

> The presence of large open pits, rock waste, toxic chemicals as well as the dust and fumes emanating from the operations of Newmont has disastrous consequences on the environment. The consequences of polluted water, land and soils can be seen in terms of bad health, lost of agricultural productivity and damaged ecosystems. The beautiful landscape has also been destroyed. There is also loss of biodiversity as most of the flora and fauna species have been destroyed by the operations of the company. Even then, Newmont refuse to accept responsibility for the adverse impact of its activities on the environment and livelihoods.

In respect of environmental degradation, respondents complained of missive destruction of the land in an around the mining concessions. An opinion leader in one of the affected community remarked as follows:

> Considering the way Newmont is destroying our environment, I can say that the negative impacts of mining far outweighs the benefits. In most parts of this community, the environment is undergoing rapid degradation and its immense economic value is diminishing due mainly to the heavy concentration of mining activities in this area. The decrease in land for agricultural production has also led to a shortening of the fallow period from 10-15 years to 2-3 years. The traditional bush fallow system can no longer be practised due to inadequacy of land. The company's activities continue to reduce the vegetation of the area to levels that are destructive to biological diversity.

Observation of some aspects of the physical environment showed negative effects of Newmont's activities on the environment. Figures 2, 3 and 4 show the extent to which the activities of the company were causing problems for the residents.

Figure 2: River Asuapre polluted by effluents from Newmont's operations
Source: Fieldwork, 2011

Figure 3: A mountain of rock waste at one of Newmont's open pits in Ntotroso
Source: Fieldwork, 2011

Figure 4: Cracks on some buildings in Kenyasi No.1 due to blasting by Newmont
Source: Fieldwork, 2011

Like other mining companies, Newmont tends to justify its actions with the assertion that it pays taxes and royalties to the Government of Ghana and also undertake Social Responsibility Programmes (SRPs) aimed at developing communities within its operational areas. However, judging by the extremely poor state of the majority of residents in mine-affected communities, the small portion of mining revenue (9% of the total) allocated to local authorities for community development purposes appears to be grossly insufficient to support

the kinds of programmes needed to adequately mitigate the negative socio-environmental impacts of Newmont's activities.

4.4 Lack of Protection against Environmental Risks Caused by Mining

Matters on lack of protection against environment risks caused by mining activities came up strongly in the study. More than 90 percent of the respondents complained of lack of support from the central government and other public sector mining support organisations to mitigate the negative impacts of mining on their livelihoods. Respondents were also concerned about the apparent lack of support from Newmont, the local government (District Assembly) and traditional leadership on matters relating to the negative impacts of mining on the various communities. It also emerged that information on the activities of the mining company such as its total concession, schedules for blasting rocks and movement of heavy duty machinery was inadequate. When respondents were asked whether they had access to information concerning the activities of Newmont that have a bearing on the environment more than 70 percent answered in the negative. This was confirmed during an interview with an opinion leader who said:

> Newmont is not ready to tell us the truth about the impact of its activities on our environment and health. Most of the information we get is based on hear-say. When you confront management of the company for information on its operations, they will keep on tossing you up and down until you become fed- up and give up.

It should be noted that, the Mineral and Mining Act of Ghana, Act 703 does not oblige mining companies to compulsorily disclose information concerning their activities to the public individuals and institutions that want information from a mining company in respect of its operations are required to pay for such information. This, together with the cumbersome and bureaucratic procedures involved in seeking information from mining companies, serves as a disincentive for residents of mining-fringe communities and prevents them from doing so. Hence, there is deficiency in Ghana's mineral policy which is being exploited by mining companies.

The seriousness with which the activities of Newmont were destroying the environment raised a lot of questions about the role of the Minerals Commission, the Environmental Protection Agency and the Forestry Commission in securing the environment and well-being of the affected people. By its mandate, the Minerals Commission recommends mineral policy, promotes mineral development, advises government on mineral matters, ensure environmentally sustainable and serves as a liaison between the government and the mining industry (Minerals Commission, 2005). The EPA is supposed to protect the country's natural resources as well as the health and welfare of the people by ensuring environmentally sound resource extraction. The Forestry Commission is responsible for the management of the country's forest to ensure a balance between mineral extraction and sustainable forest resources.

However, the study revealed that the EPA did not have an office in the Asutifi District. The only office of the EPA was located in Sunyani, the regional capital of the Brong Ahafo Region which was bedevilled with logistical constraints (as indicated by an official of the agency), and thus cannot perform its roles effectively and efficiently. The agency only conducted inspections on the activities of the mining company upon receipt of complains from the leadership of some affected communities. The District Forestry Commission also complained of inadequate staff and logistics such as vehicles to carry out its duties effectively. Hence, the Commission was not even aware that one of the five forest reserves in the district, the Bosomkese Reserve, was encroached on by Newmont. Indeed, the ability of these agencies to enforce environmental quality standards and other regulatory measures is undermined.

From the perspectives of the stakeholder institutions, a number of challenges including inadequate human and financial resources have prevented them from performing their roles effectively and efficiently. For instance the Asutifi District Assembly admitted that it was aware of the environmental hazards faced by the inhabitants of the district. An official of the Assembly admitted that his outfit has received several complains from the residents about how the activities of Newmont was impacting negatively on their environment and health. However, the official was not able to pin-point any practical measures put in place to address these problems. He attributed the failure of the Assembly to address the complaints to many challenges with financial and logistical constraints been predominant. The official from the Assembly remarked:

> Ensuring that the residents in Asutifi District especially those in mining-fringe communities live in good and healthy environment is one of the key priorities of the Assembly. As at now we have not been able to achieve this as a result of some challenges. Financial, logistical and other miscellaneous challenges are making it difficult for us to constantly monitor the activities of Newmont and punish those destroying the environment.

Heads of the other stakeholder institutions conceded that they have not lived up to the expectations of the people with respect safeguarding the environment and well-being of residents living in mining-fringe communities. This, they attributed to financial and logistical constraints. One head remarked:

> My institution has only one office space for four staff. Besides, we have no vehicle to help us perform our duties. The only motor bike available has been grounded for years. In most cases we rely on the Newmont for vehicles and instruments to do our work which is affecting our operations because some of the residents that we have been compromised by the mining company.

The above findings underscore the weakness of the various stakeholders in safeguarding the environment and well being of residents of mining-fringe communities in the Asutifi District. In the event that the various institutions are constrained by inadequate logistics and financial resources as observed in the Asutifi District, ensuring environmental justice becomes a major problem. The consequences are that the health and well-being of the people cannot be guaranteed. Eventually, residents living in mining-fringe communities are left to their fate.

5. Conclusions and Policy Implications

This paper has established that the right of residents of mining-fringe communities in the Asutifi District to live free from environmental hazards has been taken for granted. The activities of Newmont are the main driving force behind the current trend of events. The inability of stakeholders to secure the environment is a clear manifestation of leaving the residents to their fate. Both the procedural and substantive connotations of environmental justice as expressed by Agyeman and Evans (2004) have eluded the residents. Consequently, the residents continue to live in a hazardous environmental condition caused by the mining operations. Besides, the concerns and views of the residents on the poor environmental conditions in which they are living in are persistently down played or neglected by the relevant stakeholders.

In order to protect the environment and well-being of residents of mining-fringe communities in the Asutifi District, the following recommendations have been suggested. Newmont should apply international best practice to reduce the adverse impacts of its activities on the environment and well-being of residents. The company should build more containment dams to control cyanide and other chemicals in the event of spillage. Alternative sources of water such as pipe-borne water should be provided to the residents so that they will stop using water from the streams and rains that are already polluted. Institutions that regulate the activities of mining companies should be adequately resourced by the government, particularly with logistics and finance. This will enable them effectively monitor the activities of Newmont and also apply the necessary sanctions whenever the company flouts the laid down environmental compliance standards.

The existing legislation on mining and other environmental guidelines in Ghana are riddled with loopholes that are being exploited by mining companies. A second look at these laws with emphasis on how to mitigate the adverse effects of mining on the people is necessary in order to safeguard the well being of communities affected by mining operations. For instance, the provisions in the Minerals and Mining Act, Act 705 that allows mining companies to hold more than 50% of their concessions must be reviewed. This has become necessary because many mining companies including Newmont hold large tracks of lands that would otherwise be available to farmers. Also, the confidentiality clause that allows non-disclosure of Environmental Audit Reports on mines must be removed to facilitate public access to such reports. This can help put the mining companies on their toes when it comes to minimising the negative impacts of their operations on the people and the environment.

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