

The Impact of Diamond Mining on the Environment

Hadji DS Kallon *

Research and Teaching Assistant (RTA), Njala University, Sierra Leone

Research Article

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***For Correspondence:**

Research and Teaching Assistant (RTA), Njala University, Sierra Leone.

Email: hdskallon@njala.edu.sl

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ABSTRACT

As in the case of other minerals, observers commonly link mining of diamonds with damage to the environment and Sierra Leone is apparently under this influence. In this case, the most perceivable evidence of the extraction process is the overall destructive impact on the environment. This research examined the environmental impacts of the diamond mining practices of the Tonguma Limited Project (TLP), located at Tongo Field. The process investigated five communities within the Nyawa Section of Lower Bambara Chiefdom, using a sample of 75 and in a combination of qualitative and quantitative methods.

The findings revealed-on the negative side-that physical and chemical outputs of the mines have resulted in the following: minimizing and rendering farmland unfit for crop production, contaminating groundwater, drying up water wells, cracking the walls of dwelling houses and yielding noise pollution of an apparently dangerous level. By visible extension, the impacts of the mining include health problems such as occupational injuries, malaria, and diarrhea. On the positive side, the mines employ community members; it repairs damaged buildings and finances some community development projects. It has been recommended that the company establish its environmental management unit/department in the mining area to ensure that the environmental effects of mining activities in the area are reduced to the barest minimum.

INTRODUCTION

Sierra Leone, like other nations in Africa, is rich in a variety of minerals. However, the benefits of the natural wealth hardly translate into the wellbeing of the people of Sierra Leone. To accumulate wealth in a speedy way, many countries undertake the mining of minerals. However, the undertaking may also lead to destructive outcomes. For example, in many developing countries such as like Sierra Leone, Angola and the Democratic Republic of Congo (DRC), diamonds have been associated with an armed conflict that inflicted damage on human life and civilian infrastructure^[1].

However, empirical evidence is required in order to draw any dependable conclusions on any aspects of the issue and this is the target of this research.

The researcher investigated the diamond mining activities of the TLP to discover their impacts on the relevant environments of the Lower Bambara Chiefdom^[2]. The research was guided by the following research questions:

- Are there any mining-related environmental impacts in the mining areas?
- What negative effects of mining are there on the environment?
- What positive effects of mining are there on the environment?

- What are the implications of TLP support inputs that target the residents in the study area?

METHODS: LOCATION AND MATERIAL

Location

The Tonguma Project mining lease is located about 27 miles south of Kenema, in the Lower Bambara Chiefdom, Kenema District in the Eastern Province. Tonguma was selected due to its large scale mining activity and apparent high level of land degradation. Its minerals exploration, development, and production are interests in diamond deposit in Sierra Leone (Figures 1-3).

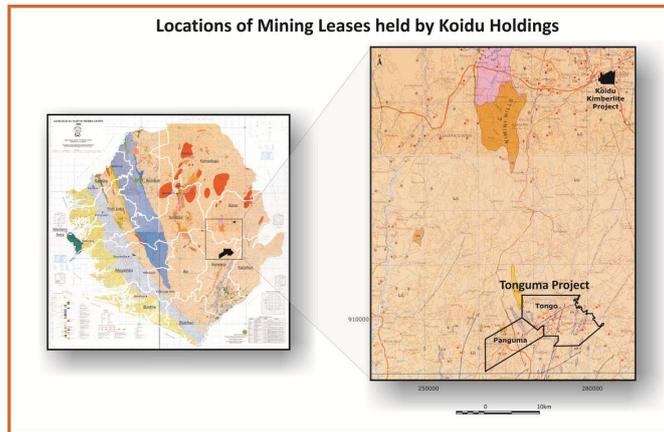


Figure 1. A map showing tonguma project concession area.

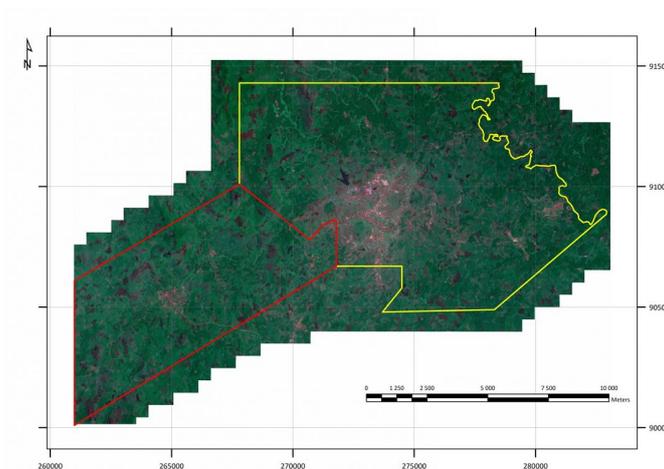


Figure 2. Satellite image of tongo mine concession area.

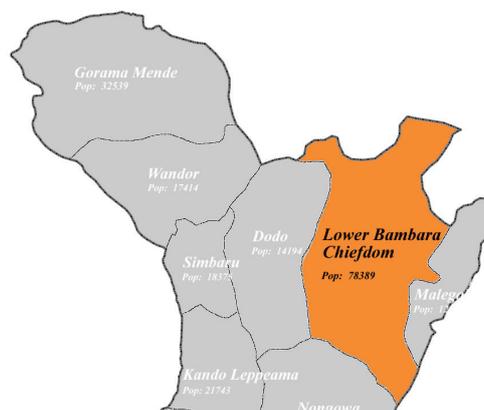


Figure 3. An extract of the study area (lower bambara chiefdom, kenema district).

Materials

Using a questionnaire interview, five (5) communities were selected due to their proximity to mine site or within the concession area of the mine site. Ten (10) respondents were taken from each community located 0.3-0.5 km away from the mine site, with the twenty-five (25) respondents taken from Stakeholders. This was done to determine variations in responses regarding mining impacts on the localities by the distance from the mines.

Data for this study were from primary and secondary sources. Primary data included administering of questionnaires in the field to residents of surrounding communities and employees of TLP.

Secondary data were culled from books, relevant articles from journals and reports of researches conducted on the impacts of mining.

Data collected were summarized and stored in statistical tables, graphs, and maps. These included frequency distribution tables and bar charts. This research is thus limited.

RESULTS AND DISCUSSION

This section presents and discusses the various findings of the research in accordance with the research questions listed in “Introduction”.

Findings from research question I: Are there any mining-related environmental impacts in the mining areas?

The most significant impact of the mining project is its effects on water quality and availability of water resources within the project area. Airborne emissions occur during each stage of the mining cycle, but especially during exploration, development, construction, and operational activities. Mining operations mobilize large amounts of material, and waste piles containing small size particles are easily dispersed by the wind [2].

The survey revealed 74 respondents (representing 98.67%) of the total sample population admitted that mining methods affect the environment with just 1 respondent (1.33%) failing to acknowledge this fact.

Findings from research question II: What negative effects of mining are there on the environment?

From **Table 1** below, the respondents noted the following environmental problems: land degradation bears the highest percentage and noise pollution are associated with mining activities in their respective communities whereas 4.10% of respondents identified damages to houses as an effect on the environment as a result of the blasting exercise [3].

Table 1. Views on mining effects.

Effects of mining	Frequency (n)	Percentage (%)
Degradation of land and vegetation	72	29.5
Water pollution	54	22.13
Air pollution	49	20.1
Noise pollution	59	24.18
No effect	0	0
Other (damages on respondents houses)	10	4.1
Total	244*	100

*NB: Responses represent respondents' first choice (there were a lot of them who noted more than one form of effects)

In addition, water scarcity seemingly found to be an alarming concern especially for the residents in the following communities: Mavehun, Sandayeima, and Kpandebu [4]. This could be as a result of the huge depth of the mine pits beyond the depths of the local wells (views) [5]. The apparently the high prevalent rate of diseases such as malaria, respiratory infections and skin diseases among the people (**Table 2**).

Table 2. Diseases frequently contracted by respondents as a result of the TLP.

Diseases	Frequency (n)	Percentage (%)
Malaria	37	24.5

Diarrhsea	25	16.6
Skin Disease	9	6
Fever	20	13.2
Colds and catarrh	22	14.6
Others		
Headache	22	14.6
Hypertension	5	3.3
Respiratory infection	4	2.6
Cholera	1	0.7
Typhoid	2	1.3
no response	4	2.6
Total	151*	100

*NB: Responses represent respondents' first choice (there were a lot of them who noted more than one form of diseases)

Findings from research question III: What positive effects of mining are there on the environment?

The company contributes to economic development by means of community employment and royalties in different forms to government and local authorities^[6]. Degraded land/rock waste periodically serves as a source of income when locally washed; little diamonds are mostly found^[7].

Survey reveals that TLP has been embarking on a series of feeder roads maintenance. The project also responds to community needs/request by providing local building materials (sands and stones) for construction of public structures like Court Barry, transportation facilities, electricity at the community radio station and sponsorship for the local football team^[8]. It is also worth noting that the clinic provided by the TLP is virtually free for all employees and their dependents. It provides ambulance services to the people in the community^[9,10].

Findings from research question IV: What are the implications of TLP support inputs that target the residents in the study area?

Due to the economic gains (employment), society has to bear the various costs of abating the effects of environmental problems in various ways.

CONCLUSION AND RECOMMENDATIONS

In as much as we acknowledge the economic benefits of mining activities in Sierra Leone, there is a need also to recognize the environmental impacts that come with it in order to find ways of dealing with them.

After an investigation into the impacts of the TLP operation, it has come to light that mining activities have resulted in land degradation leading to limited land available for local food production within the study area.

In view of the above problems, it has been recommended that the TLP should develop the Environmental Management Department that meets EPA-SL environmental management policy to ensure that the environmental impacts of mining activities in the area are reduced to the barest minimum. Even though the company has adopted measures such as re-forestation, compensation of affected communities, reviewing operation methods and resettlement of affected communities, this initiative is essential.

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 health impacts of mining activities on the people in the surrounding communities.

Stringent and rigorous efforts at re-forestation, resettlement of affected communities and other measures aimed at restoring back degraded lands to its original state after mining activities should be intensified by the company. These will not only reduce the negative environmental and health impacts on the people but also land would be available particularly to farmers for agricultural purposes.

Last but not the least, there is a need for effective collaboration and coordination among government agencies such as the EPA-SL, the Ministry of Mines and Mineral Resources and others so that they can perform their roles effectively in dealing with the environmental and health problems associated with mining activities within the affected communities.

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