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Assessing the effects of mining in the development of Gbonkolenken chiefdom, a case study of Yele town

John Tamba Borway

Lecturer, Department of Geography, Environment, Tourism and Sustainability Studies (GETSS), Ernest Bai Koroma University of Science and Technology, Sierra Leone.

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*__Corresponding author:__ John Tamba Borway

Lecturer, Department of Geography, Environment, Tourism and Sustainability Studies (GETSS), Ernest Bai Koroma University of Science and Technology, Sierra Leone.

Abstract

The mining sector contributes substantially to government revenue in Sierra Leone. Over the years, governments have made necessary efforts to improve the mineral sectors of the economy. It is therefore not surprising that the nation's medium- and long-term development strategy emphasizes modernization of minerals for industrialization and a driver of accelerated economic growth. However, the reason for this study is to assess the effects of mining on the development of the Gbonkolenken chiefdom. A case study of Yele town aimed to investigate the effects of mining in the following objectives: to assess the social, environmental, and cultural impacts of mining, to examine the economic impact of the mining company in the area, and to provide workable recommendations for sustainable mining.

The key findings of the study say that, negative impact of mining in communities of operation in Yele communities, taking to consideration the environment conditions, there is lot of land degradation which somehow cause water pollution in the communities, the other things the result shows is poor communities involvement in mining activities, this means that, the mining companies in operations in various communities are less monitor by Sierra Leone government. This gives the mining companies the excuse not to even work on their corporate social responsibilities in the communities of operation.

Keywords: *mining, natural resources, development, effects of mining.*

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Introduction

Mining has significant environmental, social, and economic effects that can be categorized into several key areas: Environmental impact, climate Change Contribution, economic impact, and social impact (Bebbington et al., 2018)

Mining is essential for modern society's infrastructure and technological needs, but it poses significant environmental challenges that require careful management and regulation to mitigate its adverse effects on ecosystems and communities (Worlanyo, 2019).

Background to the study

According to (ECA and African Union, 2018), Africa is well endowed with mineral resources, and it harbors the world's largest mineral reserve of platinum, gold, diamonds, chromite, vanadium, and management. In addition, the continent produces about 17 percent of the world's uranium. Most of these minerals are exported as raw materials. Concentrate or metals without significant downstream processing to add value. This has led to the persistent belief that the untapped mineral potential can act as a springboard for Africa's industrialization. The increase in negative environmental effects caused by mining activities has led to the disruption of local social values, traditional norms, and livelihoods of the people, which has resulted in making environmental and social requirements major features of mining legislation.

Mining is the extraction and enrichment or refinement of metalized, coal, and industrial mineral deposits (Kumar, 2019). In the sample term, it is the extraction of any non-renewable resources (Schwerhoff et al, 2019). Dubey, 2017), mining, depending on the purpose and the size of the mining operations, can be in the form of stone mining, sand mining, and mining of valuable stones, among others. The world's biggest mining mines can now be found in Africa, Asia, and Latin America (De Haas, 2016).

Historically, mining is one of the oldest documented kinds of human activity, and up until today, people have benefited from the natural riches of the earth (Dubinski, 2013). Mining is seen as one of the necessary evils of the modern world, which provides the material required to improve the standard of living (Dubey, 2017). The last 20 years have signified a drastic rise in global mining.

The mining industry plays a crucial and indispensable role in accelerating the growth and economic development of nations. Mining is central to development progress in many African countries, and natural resources endowment has, however, produced fewer development outcomes in weakly institutionalized nations (Ross Harvey, 2018).

According to statistics, Sierra Leone's mining and quarrying provided a livelihood for more than 82,000 people, and indirectly employed about 3 percent of the total labor force in the country. Mining has been a significant contributor to Sierra Leone's economy since the country gained independence in 1961. It is estimated that direct and indirect employment in large-scale mines engages over 30,000 people, with an estimated 30,000 people (including dependents and extended families) deriving their livelihoods from these mines, "President Bio, state-opening of parliament, May 2018.

According to the Sierra Leone Extractive Industry Transparency Initiative (SEITI) report 2015, Sierra Leone is endowed with rich natural resources. The mining industry is dominated by large-scale producers of iron ore, diamonds, rutile, and bauxite, with small-scale and artisanal mining of gold and diamonds. The country possesses one of the largest rutile reserves in the world. Mining is significant to the economy of Sierra Leone. Mineral exports contributed about 2.7% to the national GDP and accounted for 91.1% of total exports in 2016 (SLEITI 2015 EITI report). The mining sector in Sierra Leone is reflected by its contribution to GDP (2.7percent) and registered exports (17percent) in 2016

Despite the obvious benefits of the mining industry through the years, it is also an industry fraught with problems. After most of the African countries gained independence, some of the mines closed, and poverty and a high rate of unemployment ensued. Other mines went the opposite way, where there was a shift towards machine-oriented mining, and operations were expanded. Although the shift had a positive impact on local economic growth, it also had a major negative impact on the countries, and there are social, economic, and environmental consequences.

Mining in Sierra Leone

Sierra Leone is a resource-rich country, unfortunately known for its 'conflict' or 'blood' diamonds used by the rebellion during the 1991-2002 civil war. However, its fertile soil also contains iron ore, rutile, bauxite, and gold, and its mining sector was relatively advanced and mechanized before industrial large-scale mining ceased in 1995 due to the civil war.

Gold and iron ore were discovered in the late 1920s, diamonds in the early 1930s, and bauxite and rutile in the 1960s. When, in 1934, Consolidated African Selection Trust was initially granted a 99-year concession for prospecting and mining diamonds, it was considered one of the largest mining companies in the world.

Sierra Leone is a member of the Economic Community of West African States (ECOWAS), the Mano River Union, and the African Union. It has entered into bilateral investment treaties with the United Kingdom and Germany, and, while it is not a party to the 1958 New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, it is a party to the 1965 Convention on the Settlement of Investment Disputes between States and Nationals of Other States.

The economy of Sierra Leone is primarily based on agriculture and mining. Despite several issues (such as the lack of infrastructure and skilled workforce) that Sierra Leone shares with many emerging economies, historically the mining sector has accounted for the majority of its export revenues, foreign exchange earnings, and the government's resources, and the sector has been the second largest employer in the country. Although Sierra Leone was ranked as the poorest and least developed country in the world by the World Bank at the end of the civil war, it has undergone a period of steady growth until the Ebola outbreak in 2014. According to World Bank estimates, Sierra Leone is the country that has suffered the greatest economic losses due to the Ebola crisis.

The Sierra Leonean mining sector has undergone a number of reforms over the past decades and the last few years. Sierra Leone was under British administration between 1787 and 1896 and was a British Protectorate until 1961, when it became independent. The first piece of mining legislation enacted in Sierra Leone was the Minerals Act 1927, which was amended as the Revised Minerals Act in 1960.

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The 1960 Revised Minerals Act was replaced by the 1994 Mines and Minerals Decree, which was enacted as law in 1996 (1994 Act). The 1994 Act was slightly amended in 1999 and 2004 and supplemented by the Mines and Minerals Regulations in 1994 and the Mines and Minerals (Fees) Regulations in 2008. The 1994 Act was very similar to other mining laws (such as the 1995 Guinean Mining Code) adopted in Africa in the wake of the 1992 World Bank paper 'Strategy for Mining in Africa', which promoted foreign direct investments as well as the establishment of a clear legal framework for mining activities.

As in the case of these laws, the 1994 Act was criticized for not being sufficiently detailed on environmental, social development, health, safety, and community issues. Sierra Leone has adopted several laws and regulations over the past twelve years to tackle these criticisms and promote transparency, local content, and stronger governance, while also encouraging foreign investments:

In 2003, with the support of the UK Department for International Development and the World Bank, the Sierra Leonean government issued a 'Core Minerals Policy' with 10 'strategic objectives', including 'attracting private investments' and 'ensuring that Sierra Leone's wealth supports national economic and social development' and Sierra Leone has been a founder member of the Kimberley Process, a multi-party initiative that has developed a system of rough-diamond certification aimed at assuring buyers that they are purchasing legitimate diamonds.

In 2004, the Sierra Leonean legislature passed the Investment Promotion Act, which aims at giving foreign investors a number of guarantees in terms of expropriations, transfer of funds, and dispute resolution, and, in 2006, it joined the Extractive Industries Transparency Initiative. In 2008, the Sierra Leonean legislature adopted the Environmental Protection Agency Act 2008 (EPA Act), which provides that mining projects can only be undertaken following the preparation and approval of an environmental impact assessment and the issuance of an environmental impact assessment license. In 2009, a new Mineral and Mines Act (2009 Act) replaced the 1994 Act. It has brought about the following major changes:

It clearly sets out that applications for mineral rights will be considered on a 'first-come, first-served' basis and enables the government to award mineral rights on a public tender basis.

It states that: (i) exploration licenses and large scale mining licenses can only be granted to companies registered in Sierra Leone; (ii) an exploration license can only be granted for an initial period of a maximum of four years over a maximum area of 250 square kilometers, and (iii) a large scale mining license is granted for an initial period that cannot exceed 25 years and the state can acquire an interest in large-scale mining operations based on terms to be agreed with the license holder in a mining agreement,

It provides for the establishment of a register of mineral rights recording all "grants, renewals, area enlargements and relinquishments, transfers, surrenders, revocations, forfeitures, attachments, pledges, encumbrances, fees paid, discoveries, reports submitted, changes of address, changes of name or any other matter materially affecting the status of or any interest" in any license.

Mining and development

Mining usually brings with it rapid development and significant change (Ramani, 2012). Such as opportunities for employment, a large influx of capital, and, in some cases, in-migration and resettlement. For some communities, particularly with no history of mining, taking advantage of the benefits while at the same time coping with adverse mining effects can be daunting. Adding to people's vulnerability is the fact that the legal frameworks of many mining frontiers fail to adequately protect citizen rights or are ineffective, corrupt, or not trusted. The ICMM concludes that governance weakness, particularly at the sub-national level, is the main factor limiting positive development impacts from large-scale mining (McPhail, 2008). Mining may have the potential to have positive development impacts, but companies can inadvertently or carelessly exacerbate an already poor situation for some community members, particularly those with the least resources (Kemp, 2010).

Statement of the problem

In general, the communities where mining takes place have been experiencing serious environmental damage, which includes erosion, air pollution, formation of sinkholes, loss of biodiversity, contamination of soil, groundwater, and surface water by chemicals and sediments from the mining processes. Through dispersal of toxic wastes and other harmful byproducts of mining by wind and water over a wide geographical area, the detrimental impact is most pronounced in areas close to mines (Bridge, 2014). These adjacent communities are highly affected by the effects and damage caused by mining companies.

Environmental degradation is also a result of the creation of nearby sites for tailing storage, water storage dams and reservoirs, berms, and waste disposal pits. These alterations to the natural state of the environment are caused by the construction of exploration or access roads and mining facilities by heavy-duty mechanized equipment such as off-road vehicles, drill rigs, or seismic exploration vehicles. Most of these operations are done using heavy and noisy machinery very close to the residential areas of the local communities, especially in Gbonkolenken Chiefdom, a case study of Yele town.

Globally, mining companies have contributed greatly to the development of many economies in the world. However, the effects of mining companies still need urgent attention, particularly as mining has more negative effects than positive (Moran et al, 2014). This includes negative human activities such as illegal land grabbing, poor policies, and not negotiating with the locals, which has led to extensive mining companies not working as expected and folding up before their time.

However, there seems to be very little consideration and concern about the welfare of these people since there have been no signs of monitoring or regulating the mining operations. It should also be noted that during the exploitation of the rock and earth containing iron ore, dust and suspended particles are automatically generated in huge amounts. These practices settled in the atmosphere and on the earth's surface, convincing a large area of surrounding land and available surface water bodies, too. This will likely cause contaminated rainfall that will eventually cause destruction to the flora and fauna of the area. Also, the affected rainfall will automatically pollute surface water bodies, and this will affect people.

Stephen and Ahern (2001) also argue that the declining ambient air quality due to the spread of dust and chemicals from mining directly affects people living close by, irrespective of whether they work in mines or not. These environmental damages are a direct

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result of the large-scale removal of soil, vegetation, and overburden to access iron ore. Such large-scale mining operations have caused significant deforestation through forest clearing and the construction of roads, the removal of vegetative crops and activities associated with the construction of roads, stockpiling of topsoil, the displacement of overburden, and the hauling of soil, which increases the quality of dust around mining operations.

Incidence of malaria is also common in areas close to mining activities, though the pathways of health effects are both direct and indirect. Borrow pits left after road constructions, drains, and abandoned excavation areas in opencast mines often increase breeding sites for the malaria vector and directly increase malaria prevalence (Moran et al, 2014). The stagnant water caused by floods around the residential areas in the communities is a serious health hazard to the people living there. Outbreaks of cholera and Malaria are so frequent in these communities.

Therefore, it is against this backdrop that the researcher developed an interest to undertake this research on the effects of mining on the development of Gbonkolenken Chiefdom, a case study of Yele mines operation, to unearth what and where the problems are, and to make vital recommendations that will be useful to the Aim and Objectives of the study.

Aim of the study

This study aims to assess the effects of mining on the development of Gbonkolenken Chiefdom.

Objectives of the study are:

1. To assess the social, environmental, and cultural effects of mining
2. To proffer workable recommendations for sustainable mining practices, dressing the growing mining operations specifically in the study area.

Research Design

The methodology to be used for this research shall be the integration of the quantitative and qualitative methods. The mixed method is popular in business and social research for many reasons; depth, clarity, and flexibility in the collection of data are the most important reasons.

The qualitative method is being described as a research approach that entails observation and examination of a particular existing occurrence, trend in the present and past, making use of several sources of facts for verification. It is generally tagged as a phenomenological paradigm concept for conducting research. This method fits the research topic, being that Mining companies in Yele town development is a past and present phenomenon, which has gained much attention in recent times because of the global changes taking place in the world's legal system. The qualitative method is used to seek the reason for a particular happening. This research shall attempt to assess the effects of mining on the development of Gbonkolenken Chiefdom, a case study of Yele town.

Target population

This study estimated a population of sixty (60) respondents, both men and women. This group was chosen by the researcher because the demand fit in providing the required data needed for the study.

Sample

The sample size consisted of sixty (60) respondents, twenty-five (25) women, and thirty-five (35) men in the study area. Which will be extracted from the estimated population through a statistical method with the following formula: sample size is equal to the threshold of 30% multiplied by the population.

Sampling Techniques

A stratified sampling technique is used to select the sample. The stratified sampling technique refers to identifying a subgroup in a population and its proportion and selecting a sample from each subgroup. It is mainly used to group populations into homogeneous subsets that share similar characteristics. It will also be used to ensure equitable representation of the population in the sample (Omen and Wills, 2009). It is preferred for this study because it ensures that the subgroups are proportionate in group characteristics.

Data Analysis

A variety of tools were used to analyze it in order to capture the relevant findings, and it was presented in a way that would be understood by other research users. Therefore, the data was presented using tables and figures with the help of frequencies and percentages. The researcher employed the "mode" as a data analysis technique. The most frequent numbers or answers shall be considered dominant over the others. It is mostly ideal for qualitative data. Oso and Onen (2009).

Demographic Data

Demographic data refers to statistical characteristics of a population. This information is crucial for understanding the composition of a society and can include various factors such as age, sex, race, ethnicity, income, education level, and geographic location. Here's a detailed breakdown of the key components of demographic data.

Sex

This includes the distribution of different age groups within a population and the ratio of males to females. Understanding age demographics helps in planning services like healthcare, education, and employment.

Table 1: Showing the respondent Sex

Respondent Sex	Frequency	Percentage (%)
Male	35	58
Female	25	42
Total	60	100

Figure one: Indicates that 60% of the respondent in the study were male are 58% and female 42% with the total percentages respondent's shows that men have been more engaged in mining activities in the study or impact the development in Yele town.

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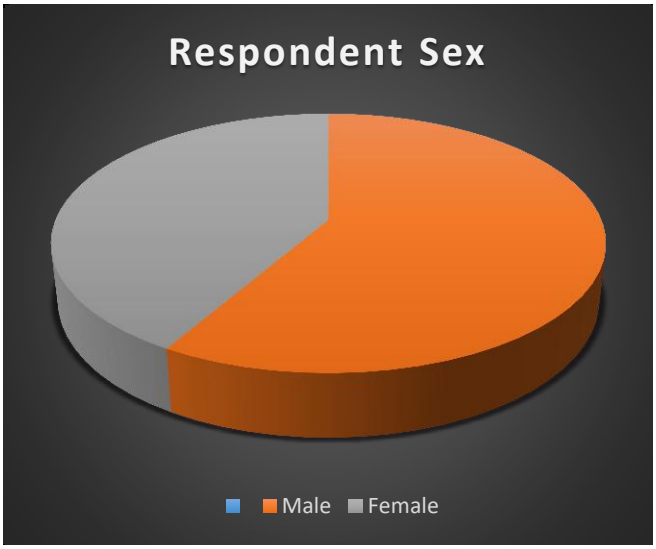


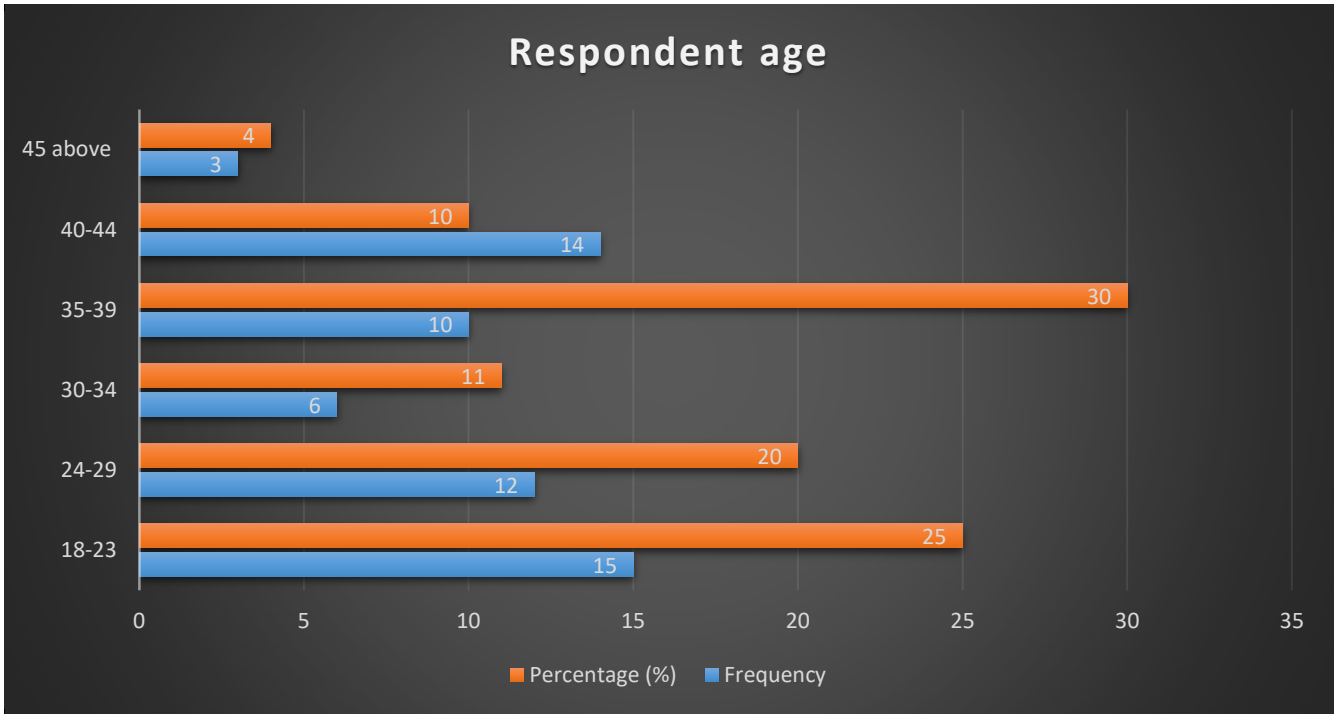
Age

This includes the distribution of different age groups within a population and the ratio of males to females. Understanding age demographics helps in planning services like healthcare, education, and employment.

Table 2: Showing the respondent Age

Respondent age	Frequency	Percentage (%)
18-23	15	25
24-28	12	20
29-34	6	11
35-39	10	30
40-44	14	10
45 above	3	4
Total	60	100

Figure 2: Respondent Age



The data on respondent Age indicates that 25% of the respondents were aged 18-23 67% were aged 24- 30, and 8% were 31 years old or above. This distribution shows that younger adults are more a likely to participate in the study, that potentially reflecting greater engagement on the impacts of mining activities on the development of Yele town.

Education

Educational attainment statistics reveal the highest level of education achieved by individuals in a population. This data is essential for workforce development and understanding societal trends related to education.

Table 3: Showing the Respondent level of education

Respondent level of education	Frequency	Percentage (%)
Non formal	10	17
Primary	30	50
Secondary	15	25
Tertiary	5	8
Total	60	100

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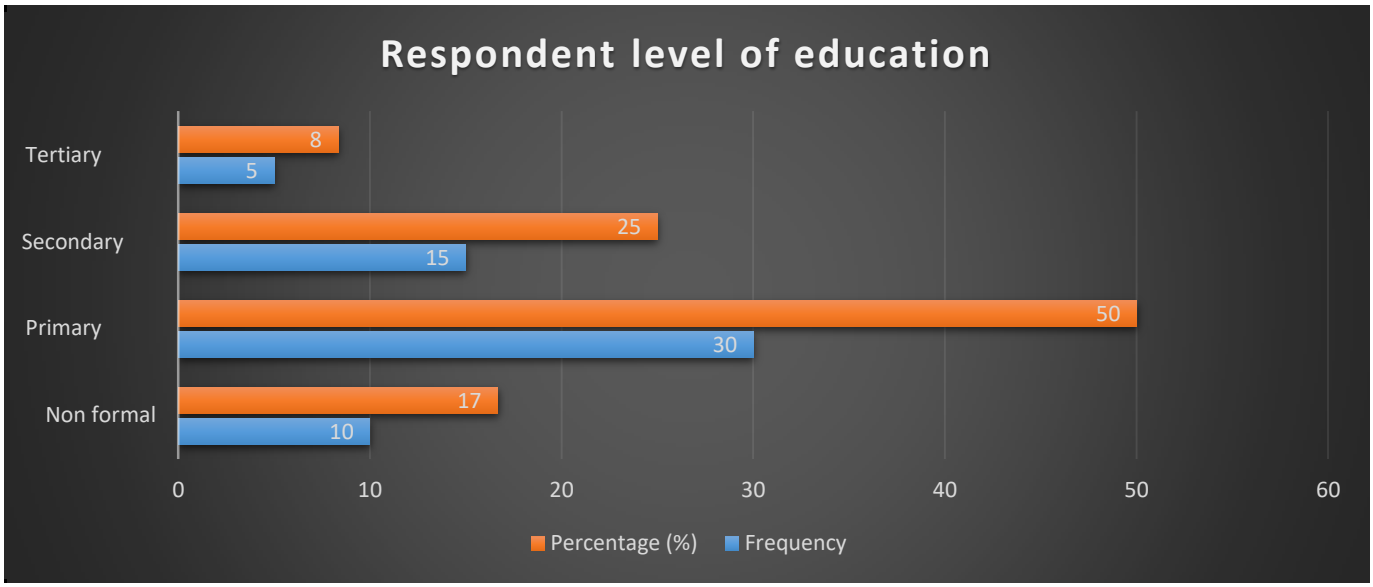
Figure3: Respondent level of education

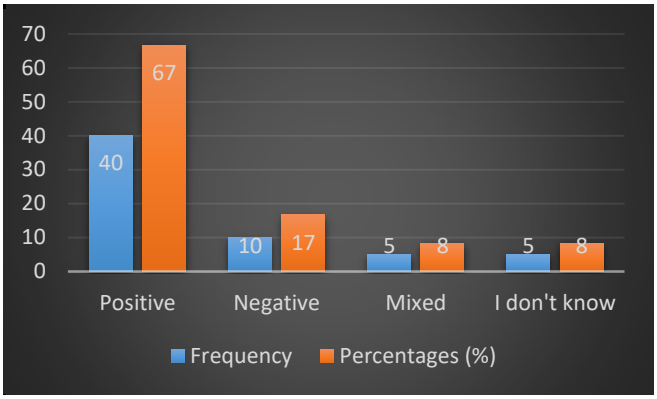


The data indicates that 17% of the respondents had no formal schooling, 50% had Primary education, 25% had Secondary education and 8% had Tertiary education. The distribution shows that a majority of respondents had limited formal education that are potentially reflecting the broader educational landscape of Yele town or the specific population samples in the study. The limited educational attainment of many respondent's may also impact their understanding and experience about the impact of mining activities and development, as well as their ability to engage with the issues in the study.

Table 4: Showing respondent's opinion on their perception of the impact of mining activities on the Gbonkolenken Chiefdom's social, environmental, and cultural aspects?

Respondent opinion on their perception of the impact of mining activities on the Gbonkolenken Chiefdom's social, environmental, and cultural aspects	Frequency	Percentages (%)
Positive	40	67
Negative	10	17
Mixed	5	8
I don't know	5	8
Total	60	100

Figure 4: Respondent opinions on their perception of the impact of mining activities on the Gbonkolenken Chiefdom's social, environmental, and cultural aspects



The data on respondents opinion on their perception of the impact of mining activities on the Gbonkolenken Chiefdom's social, environmental and cultural aspects, which shows that 67% positive,17% Negative 8% Mixed and 8% I don't know on the impact of mining in the Chiefdom's. The distribution of the respondent's shows that 67% positive says that there is social, environmental, and cultural aspects on the impacts of Gbonkolenken Chiefdom.

Table 5: Showing respondent's opinion if mining has led to an improvement in the quality of life for the people of Gbonkolenken Chiefdom.

Respondents' opinion if mining has led to an improvement in the quality of life for the people of Gbonkolenken Chiefdom	Frequency	Percentages (%)
Yes	40	67
No	15	25
I don't know	5	8
Total	60	100

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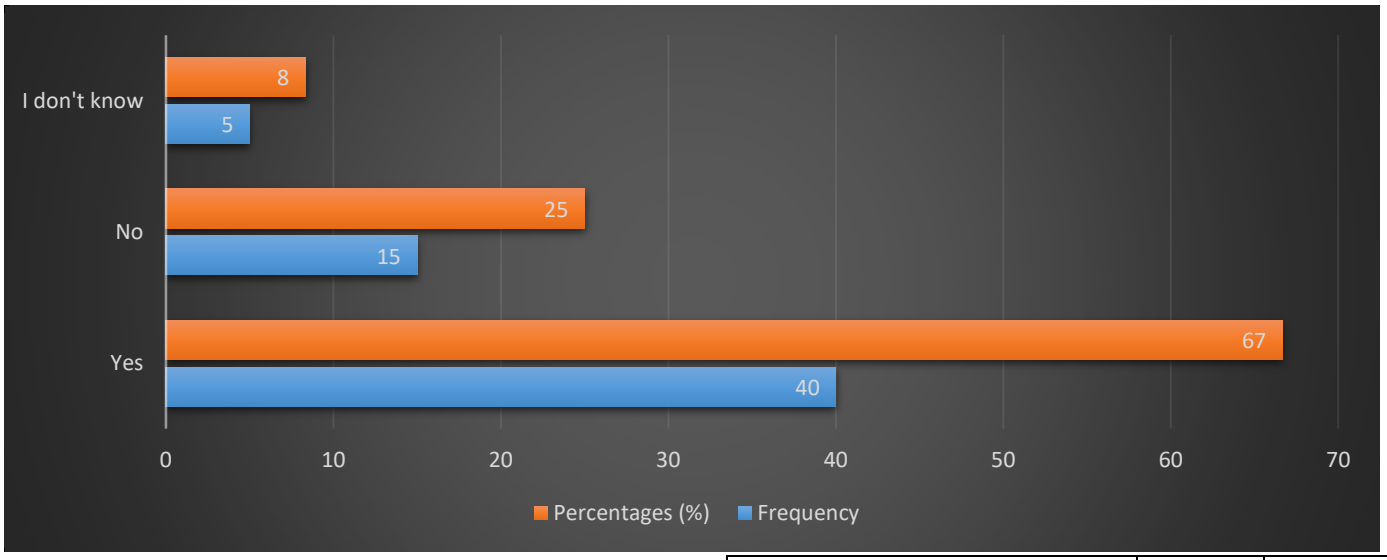
Figure 5: Respondent's opinion if mining has led to an improvement in the quality of life for the people of Gbonkolenken Chiefdom



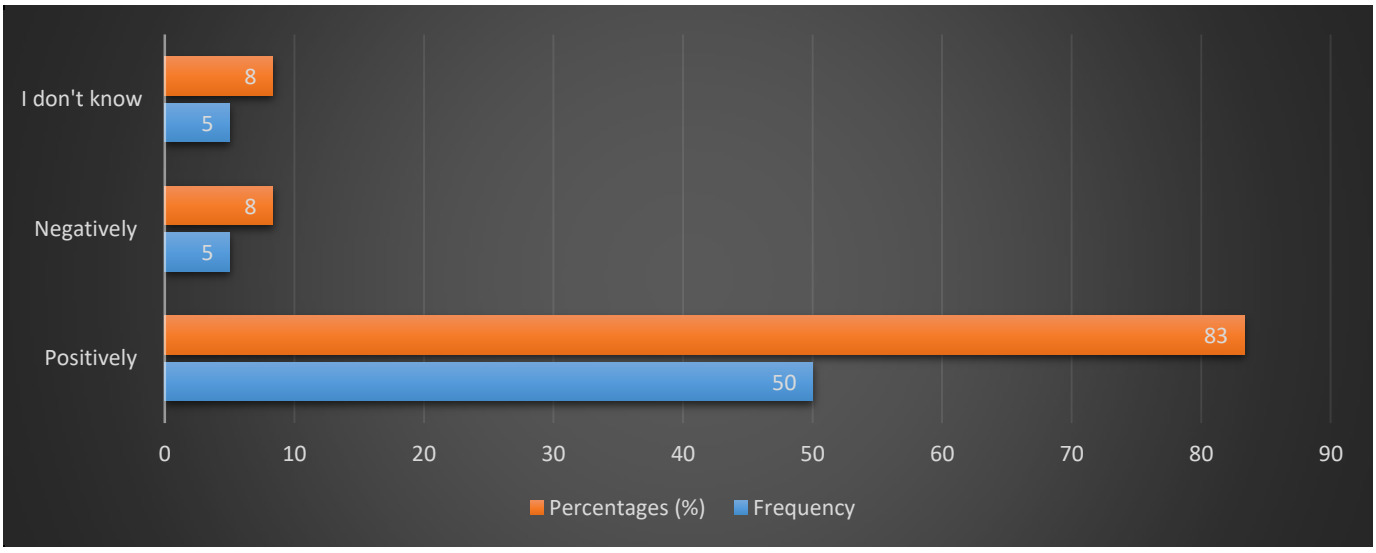
The data on respondents opinion if mining has led to an improvement in the quality of life for the people of Gbonkolenken Chiefdom 67% yes, 25 %No and ,8% I don't know with the sum total percentages of 100% subsequently.

Therefore findings show that 67% of the people in Gbonkolenken Chiefdom said yes that mining has save as a source to improve their livelihoods and contribute to the development of the Chiefdom such as infrastructure (houses, community center).

Table 6: Showing Respondents' opinion if mining has impacted the local culture and traditions of the Gbonkolenken Chiefdom.

Respondents' opinion if mining has impacted the local culture and traditions of the Gbonkolenken Chiefdom	Frequency	Percentages (%)
Positively	50	83
Negatively	5	8
I don't know	5	8
Total	60	100

Figure 6: Respondents' opinion if mining has impacted the local culture and traditions of Gbonkolenken Chiefdom.



The Data on respondents' opinion if mining has impacted the local culture and traditions of Gbonkolenken Chiefdom, 83 % positively, 8% Negative and I don't know 8% with the sum total percentages of 100% respectively. Additionally, the findings shows that mining has contribute local culture and traditions that involves the preservation efforts and cultural revitalization impact in some cases, mining companies invest in cultural preservation initiatives as part of their corporate social responsibility (CSR) efforts. This can include funding for cultural centers, festivals, or documentation of local traditions. Therefore Cultural Shift While these efforts can help preserve and revitalize local culture, that also create a more static or museum-like version of traditions, which can be disconnected from their original context and meaning in the Chiefdom.

Summary of key findings

The results indicate that 58% of the respondents were male and 42% were female. This highlights the importance of ensuring that both men and women are represented in discussions and decisions related to the impact of mining on the development of Gbonkolenken Chiefdom. The results show that the majority of the respondents, 67%, were between the ages of 24 and 30. This suggests that young adults may be the most affected by the impact

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of mining activities on the development of Gbonkolenken Chiefdom. The age group of 24-30 years old is typically the working age population, and therefore may be more directly impacted by mining activities, such as employment opportunities and changes in the local economy. The results indicate that 50% of the respondents had a primary level of education, 17% had no schooling, and 25% had a secondary level of education. Only 8% of respondents had a tertiary level of education. This suggests that a large proportion of the respondents have limited education, which may make it difficult for them to fully understand and engage in discussions related to the impacts of mining on the development of Gbonkolenken Chiefdom.

About 83% of respondents reported that mining activities have had a positive impact on local culture and traditions, suggesting that mining has promoted local arts and crafts, language, and religion. However, 17% reported that mining has had a negative impact, indicating that mining has disrupted local customs and traditions. This suggests that mining can be a double-edged sword when it comes to the preservation and promotion of local culture and traditions. The impact of mining on the physical environment and natural resources: 58% of respondents reported that mining has hurt the physical environment and natural resources, suggesting that mining activities have caused damage to local ecosystems and disrupted the availability of natural resources. On the other hand, 42% reported that mining has had a positive impact, suggesting that mining has provided opportunities for environmental remediation and sustainable resource management.

Conclusion

These findings suggest that mining can have both positive and negative effects on the Gbonkolenken Chiefdom and that sustainable mining practices should be promoted to ensure that the local community benefits from mining activities. Moreover, mining companies should be encouraged to engage with local communities and address the concerns raised in the survey to promote sustainable development and ensure that the benefits of mining are distributed fairly and equitably. In conclusion, the findings of the study highlight the complex and multifaceted nature of mining's impact on the Gbonkolenken Chiefdom. While mining can provide economic benefits and opportunities for local communities, it is important to recognize the potential negative impacts and work towards sustainable mining practices that minimize these impacts and ensure that local communities are able to benefit from mining activities.

This will require the cooperation and collaboration of government, mining companies, and local communities to develop and implement policies and practices that promote sustainable development and address the concerns of all stakeholders.

Recommendation

Government:

Establish clear and transparent regulations for mining companies, with strict penalties for non-compliance.

Develop community-based monitoring systems and engage local communities in decision-making processes related to mining activities.

Invest in education and capacity-building programs for local people to ensure that they have the necessary skills and knowledge to benefit from mining activities.

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