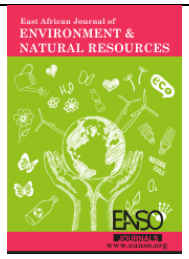
Article DOI: https://doi.org/10.37284/eajenr.8.2.3367



East African Journal of Environment and Natural Resources
eajenr.eanso.org
Volume 8, Issue 2, 2025
Print ISSN: 2707-4234 | Online ISSN: 2707-4242
Title DOI: https://doi.org/10.37284/2707-4242

EAST AFRICAN NATURE & SCIENCE ORGANIZATION

Original Article

Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector

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Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

Date Published: *22 July 2025*

Keywords: *Mining, Socioeconomic Development, Environmental Impact, Local Communities, Rwanda, Musha Sector.*

ABSTRACT

The mining industry in Rwanda, particularly in the Musha sector, plays a pivotal role in generating export revenues from minerals such as tin, tungsten, and tantalum. This study investigates the socioeconomic benefits and challenges faced by residents living near mining operations, highlighting significant implications for both socioeconomic and environmental sustainability. A mixed-methods approach was employed, collecting quantitative data from a structured survey of 378 households, selected through Yamane's formula from a target population of 27,525, complemented by qualitative insights from local leaders and representatives of Trinity Metals. Data were collected through questionnaires, interviews, and documentary reviews, and analysed using multiple regression and ANOVA, with qualitative data being thematically analysed. Findings reveal that mining activities have led to increased employment (mean = 4.06), income, and infrastructure development (mean = 4.89), while also resulting in environmental degradation and health risks associated with mining practices. Notably, residents reported a moderate understanding of operational strategies (mean = 3.57) and the effective application of safety measures, such as emergency protocol training (mean = 4.89) and personal protective equipment usage (mean = 4.53), although gaps in safe lifting techniques were identified (mean = 3.72). The study establishes that 78.3% of the variance in socioeconomic development can be attributed to mining practices, underscoring the profound impact of these activities on local communities. The research calls for enhanced safety protocols, sustainable mining practices, and further investigation into the socioeconomic dynamics linked to mining to inform policies that protect community health and promote equitable development.

APA CITATION

Innocent, G. & Maake, A. O. (2025). Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector. *East African Journal of Environment and Natural Resources*, *8*(2), 328-337. https://doi.org/10.37284/eajenr.8.2.3367.

CHICAGO CITATION

Innocent, Gatabazi and Albert Onguti Maake. 2025. "Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector". *East African Journal of Environment and Natural Resources* 8 (2), 328-337. https://doi.org/10.37284/eajenr.8.2.3367

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

HARVARD CITATION

Innocent, G. & Maake, A. O. (2025) "Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector", *East African Journal of Environment and Natural Resources*, 8 (2), pp. 328-337. doi: 10.37284/eajenr.8.2.3367.

IEEE CITATION

G. Innocent & A. O. Maake "Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector", *EAJENR*, vol. 8, no. 2, pp. 328-337, Jul. 2025.

MLA CITATION

Innocent, Gatabazi & Albert Onguti Maake. "Impacts of Mining Activities on Socioeconomic Development of Local Communities in Rwamagana District: A Case Study of Musha Mine in Musha Sector". *East African Journal of Environment and Natural Resources*, Vol. 8, no. 2, Jul 2025, pp. 328-337, doi:10.37284/eajenr.8.2.3367

INTRODUCTION

Mining is a critical economic sector in developing countries, significantly contributing to national revenues, job creation, and infrastructure development. While it acts as a driver for economic growth, mining activities can also lead to environmental degradation, social inequalities, and poor working conditions, adversely affecting local communities (Alkire et al., 2015). The global mining industry witnessed a dramatic surge during the "super cycle" from 2004 to 2008, characterised by booming metal prices spurred by China's rapid economic development (Magnus, 2010). In this context, artisanal and small-scale mining (ASM) has emerged as a vital source of income and employment for many, despite its association with negative environmental impacts and health risks. The ongoing global transition towards sustainable energy sources has heightened demand for essential minerals, such as copper, which is projected to quadruple by 2035 to meet net-zero climate targets (World Economic Forum, 2023). This increasing demand underscores the mining sector's pivotal role in providing the raw materials for technologies crucial to energy generation and consumption. However, the challenges facing East Africa, such as regulatory hurdles, inadequate infrastructure, and environmental degradation, highlight the need for responsible resource management and inclusive development strategies (Judith Faith, 2024).

In Rwanda, the mining sector plays a significant role in the country's economy, focusing on the extraction of key minerals for the international market, including tantalum, tungsten, and tin. Historically rich in mineral deposits, Rwanda's mining industry has evolved to become one of the primary drivers of export revenue, with earnings surging from $373.4 million in 2017 to $1.1 billion in 2023 (National Institute of Statistics of Rwanda, 2023). Despite these economic gains, local communities often experience minimal improvements in quality of life. Issues such as health hazards, environmental degradation, inadequate social services, and insufficient infrastructure continue to challenge the sector (Musoni, 2019). Moreover, the transient nature of employment within the mining sector raises concerns regarding job security and sustainability (World Bank, 2021).

Statement of the Problem

The socioeconomic impacts of mining activities in the Musha sector, Rwamagana district, present a complex interplay of benefits and challenges that warrant thorough examination. While mining has significantly contributed to employment generation, infrastructure improvements, and increased consumer activity within the local economy, such benefits are often overshadowed by adverse effects, including social inequalities stemming from the displacement of residents, uncertain environmental consequences like air pollution and habitat destruction, and the tragic loss of life due to mining accidents. The core problem this study addresses is the significant dichotomy between the macroeconomic benefits of mining and the localised adverse effects on community well-being and environmental sustainability, specifically in the Musha sector**.** Recent literature highlights how these mining operations, while economically beneficial, may lead to dependency and instability as communities become overly reliant on this sector. Furthermore,

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

the uneven distribution of mining benefits exacerbates existing inequalities, resulting in wealth concentration among a select few while leaving many community members marginalised. This dichotomy underscores the need for a systematic investigation into the comprehensive socioeconomic effects of mining in Musha, emphasising the necessity for inclusive governance and sustainable practices that balance economic growth with community well-being and environmental protection. Addressing these issues is crucial in developing effective policies that mitigate negative impacts and ensure equitable benefits for all stakeholders involved in or affected by mining operations.

Objectives of the Study

General Objective:

The primary objective of this study is to examine the effects of mining activities on the socio-

economic development of local communities in Rwamagana District, with a particular emphasis

on Musha Mine in the Musha Sector.

Specific Objectives:

1. To identify the mining practices employed at the Musha mining site, including methods of extraction, safety protocols, and environmental management strategies.

2. To evaluate the socio-economic impacts of mining activities on local communities, assessing factors such as income generation, employment opportunities, health conditions, and community infrastructure.

3. To analyse the relationship between mining activities and overall socio-economic development, exploring how mining influences community welfare, standards of living, and social dynamics.

LITERATURE REVIEW

This literature review discusses the socioeconomic impacts of mining, particularly its role in fostering employment, increasing income levels, and improving infrastructure in resource-rich areas, as noted by various authors. Jenkins et al. (2019) highlight that while mining generates both direct and indirect job opportunities, excessive reliance on this sector can lead to economic instability and dependency. Fraser and Newberry (2022) further emphasise the uneven distribution of mining benefits and advocate for stronger regulatory frameworks to aid sustainable development. Kipsang and Mwangi (2023) focus specifically on gold mining in Western Kenya, revealing both employment opportunities and challenges such as rapid population growth and environmental degradation affecting agriculture. Xiao et al. (2018) point out that mining jobs often offer higher wages, contributing to improved household incomes; however, Rohner et al. (2020) caution against potential income instability due to market fluctuations. The review also addresses the infrastructure improvements associated with mining, as discussed by Gizaw and Zewdie (2020), although these benefits often favour mining companies and elites over local communities. Additionally, Ross (2019) and Van der Ploeg (2019) highlight the negative social consequences of resource distribution discrepancies, including the marginalisation of displaced populations. Finally, Zhang and Li (2022) and Francis and Davies (2016) stress the importance of inclusive governance and active community participation in ensuring that mining activities contribute positively to local development while mitigating negative environmental and social impacts, an issue further reinforced by Tom H. (2021), who addresses the health and environmental concerns associated with mining practices.

More recent research continues to build on these findings. For instance, Akpan et al. (2023) in Nigeria found that while large-scale mining projects boost local employment, they often lead to increased crime rates and social conflicts, particularly in the absence of effective community engagement programs. Similarly, research by Mwesigye and Mwesigye (2023) in Uganda highlights the critical need for robust environmental impact assessments and monitoring to mitigate the widespread pollution of

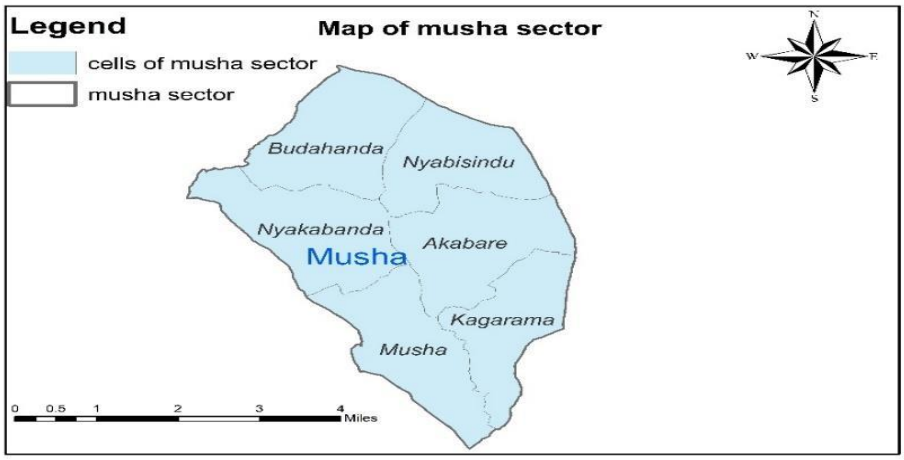
Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

water sources in mining areas. Additionally, a 2024 report by the African Development Bank (2024) emphasises that for mining to be a true engine of sustainable development, it must be accompanied by investments in education, health, and a diversification of the local economy to build resilience beyond the life of the mine. These recent studies underscore the ongoing challenges and the need for a holistic, integrated approach to mining governance.

MATERIALS AND METHODS

Study Area Description

Figure 1: Administrative Map of Musha Sector



Source: *GIS product, December 2024*

Musha Sector, located in Rwamagana District within the Eastern Province of Rwanda, is a vibrant and dynamic rural administrative division. Covering an area of 44.83 square kilometres (17.31 square miles), it is home to approximately 27,525 people, as reported by the 2022 census. With a population density of 610 people per square kilometre (1,600 people per square mile), Musha Sector reflects a growing community within its rural setting (National Institute of Statistics Rwanda, 2022).

Geographically, Musha Sector is situated in the eastern part of Rwanda, an area known for its rolling hills and fertile agricultural land. The sector's landscape is typical of the country's highland regions, offering a picturesque environment defined by hills, valleys, and small streams. This landscape is not only scenic but also highly conducive to farming, as the moderate climate allows for the cultivation of various crops. The fertile soil in Musha Sector supports the growth of essential staple crops, including maize, beans, cassava, and sweet potatoes, alongside fruits and vegetables, making agriculture the primary livelihood activity for most residents. In addition to agriculture, Musha Sector's economy is significantly supported by mining. Musha Mine, located within the sector, plays a crucial role in the local economy through the extraction of valuable minerals such as tin, tungsten, and tantalum. These minerals are important contributors to Rwanda's export economy, providing both national revenue and local employment opportunities.

Musha Mines Site

The Musha-Tunga mine is situated in Rwanda's prominent tin-producing region, specifically in the Rwamagana District, approximately 45 kilometres from Kigali in the Eastern Province. While the operation encompasses several sub-mines, over 95% of the total production is sourced from the Musha mine. The mining activities yield

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

at least 17 tonnes of tin monthly, with additional small quantities of Coltan extracted from the Duha and Ntunga sub-sites. These operations are carried out under a 25-year license granted in 2014 to Piran Rwanda Limited, but Trinity Metals Mining Company is currently operating in the study site. The mine also hosts significant deposits of high-grade lithium, particularly in the pegmatite formations of the Ntunga site. Ongoing exploration is focused on assessing the scale of these lithium deposits and evaluating potential extraction methods.

METHODOLOGY

To achieve a comprehensive understanding of how mining activities influence the socioeconomic well-being of the local population, a mixed-methods approach was employed. This approach synergistically combines quantitative and qualitative research methodologies, thereby facilitating a more robust examination of the research topic.

The mixed-methods design allows the researcher to gather quantifiable data on parameters such as income, education, employment, and health, while also capturing the qualitative aspects, including opinions, challenges, and lived experiences of community members affected by mining. Utilising this dual framework enables a holistic evaluation of mining's socioeconomic effects in Rwanda (Creswell & Plano Clark, 2018). Data was collected through structured questionnaires and guided interviews, ensuring a rich dataset for analysis.

The sampling design outlines the structured plan for selecting participants who provided essential data to fulfil the research objectives. The primary target population for this study includes individuals and groups directly impacted by mining activities in the Musha Sector. This encompasses residents, community leaders, and extends to employees of Trinity Metals, the mine's operating entity.

The residents of Musha Sector, approximately numbering around 27,525 individuals and comprising 6,906 households, serve as the primary focus of the study (National Institute of Statistics Rwanda, 2022). This group includes both those directly employed in mining operations and individuals indirectly affected by these activities. The selection of respondents was strategically determined through Yamane's formula (1967), a well-established method for calculating sample sizes based on population and margin of error.

In addition to residents, community leaders were also included as key informants in this study. Four local leaders were purposively selected based on their involvement in governance, development programs, and resource management within the sector. This selection aimed to garner insights on how mining intersects with broader community development efforts and policy initiatives. Among these leaders, there was a demographic distribution of one male and three female leaders.

Further, two leaders from Trinity Metals were chosen to provide relevant data regarding the mining operations. This included the company secretary, responsible for maintaining the firm's records, and the human resources manager, who possesses knowledge of the living conditions of the company's employees. The purposive sampling technique was applied for both community leaders and Trinity Metals representatives, ensuring that the key informants were well-informed about the socioeconomic dynamics at play.

The sample size was calculated to ensure sufficient depth of data from each stakeholder group. The derived sample size of 378 households was determined.

Ethical Considerations

Before data collection began, ethical approval was obtained from the University of Lay Adventists of Kigali (UNILAK) research ethics committee. All participants were provided with a clear explanation of the study's purpose, their right to voluntary participation, and the confidentiality of their responses. Informed consent was secured from all participants, either in written form or verbally for those with low literacy levels, and

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

their anonymity was maintained throughout the research process.

Data Analysis

The data collection process in Musha sector involved a comprehensive field survey, engaging residents of Musha sector as respondents for quantitative data and local leaders as key informants for qualitative data. Quantitative data were analysed using multiple regression and ANOVA in SPSS to determine the relationship between mining practices and socioeconomic development. For the qualitative data gathered from interviews, a thematic analysis approach was used. This involved transcribing the interviews, systematically coding the data to identify recurring themes and patterns, and then grouping these codes into broader categories to derive meaningful insights and narratives about the lived experiences of community members.

The Socioeconomic Impacts of Mining Operations on Local Communities

An analysis of data collected regarding employment generation by Musha Mines indicates that mining activities have positively influenced employment rates, with several residents securing jobs as miners for Trinity Metals Ltd. This finding is supported by a mean score of 4.06, reflecting increased customer traffic and subsequent consumption in local markets and shops, which yielded a mean of 4.07. When examining the impact of mining on infrastructure development, the research revealed a significant correlation, with a mean score of 4.89. Additionally, electrical energy generation (mean = 3.42) and improvements in energy utilisation (mean = 3.78) were noted, alongside the availability of public utilities (mean = 4.53). However, the relatively lower mean for electrical energy generation and energy utilisation, coupled with a high standard deviation (0.55), suggests that community members remain uncertain about the direct benefits of mining practices on these infrastructures, although they did not entirely refute the claims. In the Musha region, mining practices have contributed to social inequalities through the displacement of local residents in areas where mines are situated. This assertion is supported by an overall mean of 4.03 (SD = 0.71), indicating strong agreement among respondents concerning the existence of social disparities attributed to mining operations. Assessments of the adverse effects of mining on human life revealed that mining activities have indeed resulted in detrimental impacts, as reflected in the responses from 378 surveyed households. Statistical measures of mean and standard deviation were employed to analyse the data. Community members expressed uncertainty regarding mining's role in air pollution (mean = 3.33) and large-scale habitat destruction (mean = 3.64), as means around 3 on a five-point Likert scale suggest a neutral stance rather than outright disagreement. Furthermore, qualitative data gathered from interviews with representatives from Trinity Metals Mining Company and local leaders confirm instances of fatalities due to mining collapses in Musha. Notably, local leaders reported that 15 miners lost their lives in 2024 as a consequence of such incidents.

RESULTS DISCUSSION

The results of this study demonstrate a significant and strong relationship between mining practices and socioeconomic development in the Musha sector.

Table 1: Model Summary of Regression Analysis

Model	R	R Square	Adjusted R Square	std. error of the estimate
1	0 .885	0.783	0 .710	650.22175

a. Predictors: (Constant), mining practices

Source: *SPSS / Researcher, March, 2025*

The R-value of 0.885 indicates a robust positive correlation, suggesting that variations in mining practices have a considerable impact on the socioeconomic outcomes within the community. This correlation emphasises the pivotal role of mining activities as a driver of economic growth

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and development. The R Square value of 0.783 reveals that 78.3% of the variation in socioeconomic development can be attributed to the mining practices employed at the Musha mining site. This high percentage indicates that mining practices are fundamental in influencing the economic conditions and overall progression of the region. Additionally, the adjusted R Square value of 0.710 corroborates the strength of the relationship, considering the number of variables examined in the analysis.

Dependent Variable Coefficients.

Table 2: Coefficients for Socioeconomic Development

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	298.420	401.803		.743	.512
	mining practices	.753	.229	.885	3.286	.046
a. Dependent Variable: Socioeconomic development						

The findings indicate a key coefficient of **0.753** for mining practices, suggesting that an increase of one unit in mining practices corresponds to an expected increase of 0.753 units in socioeconomic development. Coupled with a standardised coefficient (Beta) of **0.885**, these results provide strong evidence that mining practices exert a positive influence on socioeconomic advancement. Furthermore, statistical significance is illustrated by a p-value of 0.046, which is below the conventional significance level of 0.05, asserting that the relationship between mining practices and socioeconomic development is unlikely to result from random variation. The t-value of 3.286 further supports this conclusion as it exceeds the threshold of 2, indicating a significant effect on the dependent variable. While the Standard Error of the Estimate (650.22) conveys the average deviation of observations from the regression line, its interpretation is more meaningful when considered in conjunction with other model parameters, including p-values and F-statistics. Lastly, the unstandardised coefficient for the constant, valued at 298.420, represents the expected level of socioeconomic development when mining practices are at zero. However, this constant is not statistically significant, as indicated by a p-value of 0.512, suggesting it does not contribute meaningfully to the model's predictive capability.

In summary, the findings of this study underscore the vital role of mining practices in fostering socioeconomic development in the Musha sector. These results also highlight the need for sustainable practices that mitigate the potential adverse effects associated with mining activities, ensuring balanced economic growth and community well-being.

The qualitative data from interviews with local leaders and company representatives provides crucial context for these quantitative findings. For instance, while the quantitative data shows a high mean for infrastructure development (4.89), interviews revealed that this development is often concentrated around the mine site and may not benefit all community members equally. A local leader highlighted this disparity, stating, "The company built a new road, but it only goes to the mine entrance. Our village still struggles with impassable roads, especially during the rainy season." This qualitative insight adds depth to the quantitative measure. Similarly, the tragic qualitative findings regarding fatalities due to mine collapses (15 lives lost in 2024) serve as a stark reminder of the human cost that statistical averages on employment and income do not fully capture. This underscores the urgency for enhanced safety protocols, a point strongly supported by the qualitative evidence.

Comparative analysis with previous studies supports the current findings, highlighting both the benefits and challenges of mining. Dushime and Bimenyimana (2022) reported similar

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

socioeconomic improvements, such as job creation and better infrastructure in Rwanda's Rutongo mine, despite being in a different location. Similarly, Takyi's (2024) study in Ghana revealed that poverty-driven child labour in mining negatively impacts children's education. Although child labour at the Musha mine has been addressed by local authorities and Trinity Metals, similar issues were present during earlier illegal mining activities. These comparisons emphasise the widespread socioeconomic trade-offs of mining, especially its impact on vulnerable groups like children.

Limitations

This study acknowledges several limitations. The reliance on self-reported data from community members may introduce a potential for social desirability bias, where respondents might provide answers they believe are expected. Additionally, as a case study focused on the Musha mine in Rwamagana District, the findings may not be fully generalizable to other mining sites in Rwanda, which may have different operating contexts, mineral types, and community dynamics. Acknowledging these limitations is crucial for a balanced interpretation of the results.

CONCLUSION

The findings from the analysis of mining practices in Musha highlight both the socioeconomic benefits and challenges faced by local communities. On one hand, the increase in employment opportunities and consumer activity demonstrates a positive impact on local economies, with significant infrastructure improvements also noted. However, these benefits come at a cost, as evidenced by the social inequalities arising from the displacement of residents and the uncertainty surrounding the environmental consequences of mining activities. Although some community members acknowledge infrastructure improvements, their mixed responses regarding air pollution and habitat destruction reflect a general ambivalence about the overall impact of mining practices. Additionally, the tragic loss of life due to mine collapses underscores the necessity for enhanced safety measures and regulations in the mining sector. Ultimately, while mining operations can drive economic growth, there is a critical need for policies that address the social and environmental repercussions affecting local communities to ensure a more equitable and sustainable development approach.

Recommendations

- **Enhance Safety Regulations:** Establish and enforce stricter safety regulations in mining operations to prevent accidents and fatalities. This includes regular training for miners on safety protocols, implementation of safety equipment, and regular safety audits of mining sites to ensure compliance.
- **Promote Community Engagement:** Involve local communities in decision-making processes regarding mining operations. This can help ensure that their voices are heard and that their needs and concerns are considered, fostering a sense of ownership and accountability among both mining companies and community members.
- **Compensate and Support Displaced Residents:** Develop comprehensive compensation packages for residents displaced by mining activities. Additionally, provide support such as relocation assistance, job training programs, and integration into the local economy to facilitate their transition and minimise social inequalities.
- **Diversify Local Economies:** Encourage diversification of the local economy beyond mining to reduce dependency on this sector. Supporting local businesses and agriculture can create additional employment opportunities and promote economic resilience.
- **Conduct Future Longitudinal Research:** To gain a deeper understanding of the long-term effects of mining on community well-being, future research should consider longitudinal studies to track socioeconomic and environmental changes over an extended

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

period. This would provide valuable insights into the sustainability of benefits and the cumulative impacts of mining operations.

REFERENCES

African Development Bank. (2024). *Mining for development: Building resilience and fostering diversification in Africa*. Abidjan, Côte d'Ivoire.

Akpan, O. E., Essien, S. E., & George, M. U. (2023). Large-scale mining and community conflicts in Nigeria: A study of selected mining sites in Zamfara State. *Journal of Social and Political Sciences, 6*(1), 12-25.

Alkire, S., Meinzen-Dick, R., & Fisher, M. (2015). Mining, growth, and sustainable development in developing countries. *International Journal of Development Studies, 23*(2), 85-104.

Borrego, A. (2017). *Resource extraction and social stratification: A global perspective*. Routledge.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage Publications.

Dushime S. & Bimenyimana A. (2022). The Impacts of Mining Activities on Local Community Livelihood in Rwanda "Case of Rutongo Mining Site in Rulindo District". *International Journal of Advances in Engineering and Management (IJAEM): UNILAK-Kigali-Rwanda*.

Francis, J., & Davies, E. (2016). *Community participation in mining governance: Pathways to sustainable development*. Oxford University Press.

Fraser, A., & Newberry, P. (2022). Mining, local employment, and regional development: The socio-economic impacts of large-scale mining in Africa. *World Development, 144*, 105418.

Gizaw, S., & Zewdie, S. (2020). Impact of mining infrastructure on local communities' economic development in Ethiopia: A review. *Journal of Mining and Environment, 11*(2), 210-221.

Jenkins, R., O'Callaghan, T., & Huang, S. (2019). The impact of mining employment on local economies: A case study of the Musha sector. *Journal of Development Economics, 68*(2), 211-225.

Judith Faith N. (2024). Mineral Resources and Economic Development in East Africa. *Eurasian Experiment Journal of Arts and Management (EEJAM) Kampala – Uganda*.

Kipsang, K., & Mwangi, W. (2023). Impact of mining on employment and economic development in Kenya: A case study of gold mining in Western Kenya. *Economic Modelling, 105*, 108589.

Magnus, E. (2010). GLOBAL MINING TOWARDS 2030 Background material and food for thought for the Finnish mineral strategy process 2010. Lulea University of Technology: Sweden.

Musoni, A. (2019). *Challenges and opportunities in Rwanda's mining sector*. African Economic Research Consortium.

Mwesigye, J., & Mwesigye, S. (2023). Environmental impacts of artisanal and small-scale mining in Uganda: A review of regulatory frameworks and mitigation strategies. *Journal of Environmental Management, 345*, 118867.

National Institute of Statistics of Rwanda (NISR). (2023). *Economic performance report for 2023*. National Institute of Statistics of Rwanda. https://www.statistics.gov.rw

National Institute of Statistics of Rwanda. (2022). *Population and housing census report 2022*. National Institute of Statistics of Rwanda. https://www.statistics.gov.rw

Rohner, D., Sandor, L., & Emmenegger, M. (2020). Understanding income volatility in mining communities. *International Journal of Economic Development, 35*(2), 143-160.

Article DOI: https://doi.org/10.37284/eajenr.8.2.3367

Ross, M. (2019). Social inequalities and mining: Examining the role of extractive industries in exacerbating disparities. *Journal of African Development, 40*(2), 112-128.

Takyi, S. (2024). Natural resources extraction and education in Ghana: Understanding the impact of gold mining on children's education in the Kenyasi community.

Tom H. (2021) Harmful Impacts of Mining. Responsible Mining Foundation: Switzerland

Trinity Metals Ltd (2022) *Occupational Health & Safety*. Trinity Metals LTD: Kigali-Rwanda.

Van der Ploeg, F. (2019). Resource extraction and inequality in rural areas: The case of artisanal mining. World Development, 120, 139-149.

World Bank. (2021). *Mining for sustainable development: The Rwandan context*.

World Economic Forum (2023). *Mining and Metals: Trends, Challenges and the Way Forward*.

Xiao, Z., Zhao, X., & Zhang, L. (2018). Income diversification and socio-economic stability in mining-dependent communities. *Resources Policy, 56*, 93-100.

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.

Zhang, L., & Li, Q. (2022). *Inclusive governance in mining sectors: A pathway to equitable development*.

