



Environmental and Health Impact of Small-Scale Gold Mining Activities in Ibanda District of Uganda

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ABSTRACT: In the recent past, artisanal small-scale gold mining activities in Kicuzi Subcounty, Ibanda District, Uganda, have had a severe influence on the environment and people's health. The study investigated the environmental and health impacts of small-scale. The questionnaires of 156 respondents were given to the Ibanda District's surrounding areas. The findings demonstrated that p-value is substantially associated with perception and the surroundings ($p < 0.0005$). The finding also demonstrates that p-value is substantially connected with the environment and health ($p < 0.0005$). The findings revealed that diarrhoea, skin illness, and injuries are the most common ailments in the population. As can be observed from the results, 75% of health workers admit that the health system in this municipality is not equipped to deal with mining-related health issues.

DOI: <https://dx.doi.org/10.4314/jasem.v26i5.1>

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Impact factor: <http://sjifactor.com/passport.php?id=21082>

Google Analytics: <https://www.ajol.info/stats/bdf07303d34706088ffffbc8a92c9c1491b12470>

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Dates: Received: 08 November 2021; Revised: 13 April 2022; 20 May 2022

Keywords: artisanal gold mining; environmental impact; health impact; Ibanda District of Uganda

MSGM (miniature artisanal and gold mining) activities are often found in places with substantial mineral resources and low labor costs. The substantial impact of artisanal small-scale gold mining (ASGM) is related to job generation, foreign exchange gains, and the country's economic growth. ASGM provides assistance in locations where natural resources are being deposited and simple tools and appliances are being used. Many countries have turned to a variety of activities to exploit natural resources in order to achieve rapid economic development. Mining is one of the most profitable activities. As a result, mining is a significant economic endeavor with the potential to contribute to the development of the community that provides the resource (Allen, 2019; Arah, 2015; Arifin *et al.*, 2015; Aboka *et al.*, 2014 and Ayanbo *et al.*, 2014). Mining has a wide range of environmental and health consequences. This has resulted from mining corporations' operating tactics, as well as their effects

on the natural environment and people beings in the surrounding towns. The health benefits of mining activities often outweigh the earnings. Small producers, including authorized miners and craftspeople, have produced the majority of gold. Artisanal miner production numbers are common, considering that most contractors are unlicensed, and even those that are licensed learn to under-proclaim. As a result, the majority of gold mining is done in questionable ways (Awomeso *et al.*, 2017; Basu *et al.*, 2015). The Ugandan government recently included small-scale mining activities in the draft national mining and minerals policy. This strategy, along with the government's master plan, will serve as the foundation for mining legislation and regulations. The significant impact of small-scale mining activities will be greatly needed in light of this planned policy (Omara *et al.*, 2019). Simba Mining Company has reopened the Kitaka Gold Mine in the Kasyoha-Kitomi

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forest reserve in Ibanda District, which has been closed for more than 50 years (Eludoyin *et al.*, 2017; Omara *et al.*, 2019). Despite being mined on a modest scale, the finding of gold in the Ibanda District provides employment to thousands of locals. Since the creation of small-scale mining activities, the community has had three major impacts: rapid loss of farmland, water and soil pollution, and difficulties in managing mine wastes (Omara *et al.*, 2019).

ASGMs are typically confronted with a variety of problems, including occupational, environmental, and social factors. The main environmental and health hazards associated with artisanal and small-scale gold (ASG) mining are elemental mercury emissions and cyanide toxicity, both of which have negative consequences for humans, animals, plants, and aquatic species (Nakazawa *et al.*, 2016; Arah, 2015; Ministry of Health, 2014). At both local (mine sites) and broader scales, gold mining degrades forest functions and has a negative impact on biodiversity, protection, and economic values of the forest (forest surrounding the mining sites and construction of roads). In terms of better livelihoods and the prevalence of illnesses linked to mercury poisoning, the indigenous community benefits in a limited way from existing mining activities.

ASG miners are regularly subjected to hazardous health, safety, and living situations and they typically use ineffective and dangerous "prospecting and extraction" practices (Ministry of Health, 2014). In this industry, the use of mercury in gold processing has resulted in increasing occupational health and environmental dangers. Miniature gold mining has increased as a result of rising poverty and a persistent and continuous lack of rain. Farmers who have settled down have turned to ASM as a source of income, and they are collaborating with miners to facilitate mining on their land. ASM has been embraced as part of a coping master plan to mitigate the economy's negative effects, penury and lack of rain. Artisanal mining is probably more profitable than agriculture, gaining momentum in the past two decades (UBOS, 2017, Ministry of Health, 2014). Miniature gold mining leads employment generation, it is associated with ecological and health hazards. Artisanal small-scale gold mining has been acknowledged as one of the major pilots which are accountable for the demolition of the environment (Awomeso *et al.*, 2017).

However, the environmental and health impacts of small-scale mining activities have not been carried out in Kicuzi Sub-county, Ibanda District. The objective of this work is to assess the environmental and health effects of artisanal small-scale mining activities in Kicuzi Sub-county, Ibanda District, Uganda.

MATERIALS AND METHODS

A survey questionnaire was distributed to 156 residents in the Division in order to meet the research objectives. The analysis was carried out using the Statistical Package for the Social Sciences and a qualitative approach (SPSS). Officials and employees of local health centers were also approached for pertinent information. Moreover, there field observations of the mine sites and other areas to determine the effects of mining operations on the environment. Background information about respondents, awareness, perception, and consequences of mining in the surrounding areas, health status of residents in the surrounding communities, food security, and the status of health facilities were all collected. This study included primary and secondary data collected through questionnaire administration, as well as literature, intent, and journals, among other sources.

RESULTS AND DISCUSSION

In this district's Ibanda settlements, both surface and underground mining were exploited. Both surface and subsurface mining, according to the respondents, have negative environmental consequences. Mining has been a major contributor to the destruction of land and vegetation in this area, as seen in Table 1. It also leads to pollution, such as water contamination, air pollution, and noise pollution, as seen in the table. Land degradation is one of the principal effects of surface mining, as illustrated in Table 1. The outcome is in line with Kessey and Arko's expectations (2013). Table 2 demonstrates that diarrhoea, skin illness, and injuries are the most common diseases in the community. Mining activities have resulted in fatalities, according to 75% of health personnel. The result is in agreement with Omara *et al.*, 2019. Heavy machinery used to remove top soil, trees, and vegetation wears away the soil nutrients, rendering the ground unfit for farming. Table 4 reveals that the Ibanda District has the highest number of female miners (64.2 percent). In the Ibanda District, the percentage of respondents who had attended school was very high. The majority of the miners in this area have completed vocational and tertiary schooling. Table 4 shows that mining has been a key source of income in this municipality and has resulted in job possibilities for the educated. Farmers have benefited the most from mining activity (81), followed by business people (73). Child labor was more prevalent in ASGM sites that are more informal and where involvement is more voluntary.

Table 1: Extraction Methods and its Effect

Count	Some Effects				Total
	A	B	C	D	
Extraction Methods					
Surface Mining	57	16	6	0	79
Underground Mining	40	28	4	5	77
Total	97	44	10	5	156

A= Degradation of Land and Vegetation; B = Water Pollution; C = Air Pollution D = Noise Pollution

Table 2 Mining Associated Diseases

Valid	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Diarrhea	4	33.3	33.3	33.3
Skin Diseases	3	25.0	25.0	58.3
Injuries	5	41.7	41.7	100.0
Total	12	100.0	100.0	

Table 3: Effects of Mining on the Environment

Valid	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Degradation of Land and Vegetation	94	60.3	60.3	60.3
Water Pollution	43	27.6	27.6	87.9
Air Pollution	12	7.7	7.7	95.6
Noise Pollution	7	4.4	4.8	100.0
Total	156	100.0	100.0	

Table 4: Socio-Demographic characteristic in Ibanda District

Count	Occupation											
	Business							Youth				
	Resident	Person	Student	Farmer	Manager	Teacher	Employer	Principal	Leader	Jobless		
Sex												
Male	0	16	17	35	18	9	11	1	9	18		
Female	8	12	8	16	0	5	0	0	0	9		
Total	8	28	25	51	18	14	11	1	9	27		

Noise pollution is also predominant in communities that are close to mining areas, and surrounding communities. The heaviest impact of mining activities has been land and vegetation degradation (66.4%) followed by water pollution (25.4%). air pollution and noise pollution are 5.5% and 2.8 respectively. The results from table 9 revealed that perception and environment is significantly correlated with p-value ($p < 0.0005$). The result also depicts that environment and health is significantly correlated with p-value ($p < 0.0005$). It is in agreement with Ministry of Health, Uganda.

Table 5: Education Level

Valid	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Secondary	34	21.8	21.8	21.8
Vocational	58	37.2	37.2	59.0
Tertiary	64	41.0	41.0	100.0
Total	156	100.0	100.0	

Mining activities have been blamed for land and vegetation degradation (66.4%). Since farming is directly negatively impacted by land and vegetation

degradation with such a high percentage has undermined farming in this locality.

Table 6: Education Level

Valid	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Married	79	50.6	50.6	50.6
Unmarried	43	27.6	27.6	78.2
Divorced	34	21.8	21.8	100.0
Total	156	100.0	100.0	

Table 7 Health Cases

Significantly fatal	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Yes	9	75.0	75.0	75.0
No	3	25.0	25.0	100.0
Total	12	100.0	100.0	

Table 8 Medical readiness to handle health cases

Valid	Frequency		Valid Percent	Cumulative Percent
	Frequency	Percent		
Yes	3	25.0	25.0	25.0
No	9	75.0	75.0	100.0
Total	12	100.0	100.0	

Table 9: The Effects of Residential on the Environment, Health, and Perceptions

		Health	Perceptions	Environment
Health	Pearson Correlation	1	.225*	.447**
	Sig. (2-tailed)		.025	.000
	N	156	156	156
Perceptions	Pearson Correlation	.225*	1	.612**
	Sig. (2-tailed)	.025		.000
	N	156	156	156
Environment	Pearson Correlation	.447**	.612**	1
	Sig. (2-tailed)	.000	.000	
	N	156	156	156

Correlation is significant at the 0.05 level (2-tailed). Correlation is significant at the 0.01 level (2-tailed).

The study has emphasized policy applicability issues, such as the need for more awareness campaigns and programs for proper management of small-scale gold mining (ASGM) activities and effective regulations to enable spatial vegetation cutting without depletion in Ibanda District, based on the findings of these research studies. As a result, both government and non-governmental groups should make a concentrated effort to improve household perceptions and cognition approaches to environmental media interaction in the District through effective collaboration and coordination. It is highlighted that re-afforestation initiatives are required near and within the mine, since

trees are taken down and replaced with new ones to ensure the future environment. To prevent mishaps, Simba Mining Company must offer safety equipment to its employees and implement safety precautions in hazardous areas. Similarly, more comprehensive mitigation measures for the negative impacts of mining on the environment and health of people living in and around Kitaka gold mines, Ibanda District, must be designed and implemented in collaboration between environmentalists and health workers. Future studies can be conducted on the effects of intervention measures adopted and implemented by mining companies and stakeholder organizations in the surrounding communities, and national environmental, health, and mining regulations are needed to generate effective policies in environmental management that can sustain the environment. The following are the contributions to the current body of knowledge based on the findings of this study: The effects of gold mining activities in the Ibanda District on environmental media interaction (i.e., soil, fill material, other geological materials, etc.) and the demographic features of gold miners in the Division are investigated. As a result, the effects of gold mining on vegetation loss in Ibanda Municipality as well as the health of miners in Ibanda communities have been determined.

REFERENCES

- Allen, M (2019). Large-scale mines and local-level politics: Between New Caledonia and Papua New Guinea. *J. Australian Geogra.* 1-4.
- Aboka, YE; Cobbina, SJ; Doke, AD (2018). Review of environmental and health impacts of Mining in Ghana. *J. Health. Pollute.* 17, 43-52.
- Arah, IK (2015). The impact of small-scale gold mining on mining communities in Ghana. African Studies Association of Australasia and the Pacific (AFSAAP) 37th Annual Conference – Dunedin
- Arifin, YI; Sakakibara, M; Sera, K (2015). Impacts of Artisanal and small scale gold mining (ASGM) on environment and human health of Gorontalo Utara Regency, Gorontalo Province, Indonesia. *J. Geosc.* 5(2), 160–176
- Awomeso, JA; Taiwo, AM; Dada, EO; Ayantobo, OO (2017). Human health and environmental assessments of small scale and artisanal mining activities in the Gold City of Ijesha- land, South Western Nigeria. *J. Environ System Res,* 6(18), 1-11.
- Ayantobo, OO; Awomeso, JA; Oluwasanya, GO; Bada, BS; Taiwo, AM (2014). Gold mining in Igun-Ijesha, Southwest Nigeria: impacts and implications for water quality. *Amer. J. of Environ Sc.* 10, 289–300
- Basu, N; Clarke, E; Green, A; Calys-Tagoe, B; Chan, L; Dzodzomenyo, M; Fobil, J; Long, RN; Neitzel, RL; Obiri, S; Ode, E (2015). Integrated assessment of artisanal and small-scale gold mining in Ghana Part 1: Human Health Review. *Inter. J. Environ Res. Pub. Health.* 12, 5143–5176
- Eludoyin, AO; Ojo, AT; Ojo, TO; Awotoye, OO (2017). Effects of artisanal gold mining activities on soil properties in a part of southwestern Nigeria. *J. Environ. Manage. Conserve.* 3, 1-14.
- Nakazawa, K; Nagafuchi, O; Kawakami, T; Inoue, T; Yokota, K; Serikawa, Y; Elvince, R (2016). Human health risk assessment of mercury vapor around artisanal small-scale gold mining area, Palu city, Central Sulawesi, Indonesia. *J. Ecotox. Environ Safety.* 124, 155–162
- Omara, T; Karungi, S; Ssebulime, S; Kiplagat, KM; Bongomin, O; Ogwang, R; Akaganyira, S (2019). Artisanal and Small-Scale Gold Mining in Syanyonja, Busia Gold District, South Eastern Uganda: Impacts on the Mining Population and the Environment. Doi: 10.20944/preprints201910.0298.vi
- UBOS (2017). National Population and Housing Census 2014-Area Specific Profiles-Isingiro District.
- Uganda Bureau of Statistics 2016, the National Population and Housing Census 2014-Main Report, Kampala, Uganda.
- Ugandan Ministry of Health (2014). The Uganda Malaria Reduction Strategic Plan 2014-2020.