



Study on the problematic situations of diggers in the artisanal mining sector: Case of Kawama village, DR Congo

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Abstract

This study aims to analyze the problem situations relating to environmental management in the artisanal mining sub-sector. The results indicated the significant presence of children compelled to harmful work in the economic activities of mines and quarries. It begins by presenting the proportion of children working in the artisanal mining sector. She is also interested in the descriptive data drawn from the questionnaires concerning four fields of information: 1) the distribution of diggers according to sex 2) the distribution of diggers according to knowledge of the risk linked to the profession following environmental pollution 3) compliance with the provisions of the mining law by the structures committed to the management of artisanal mining 4) the distribution of diggers according to suspected illnesses related to environmental pollution. The article also examines the relationships between the environmental problem-situation and the variables of these four fields. The study also identified several environmental and health issues related to environmental management in this sub-sector of artisanal mining. Thus it was found that these diggers from Kawama village still have a more assertive perception of this pollution, which is why they cite the following diseases for which this pollution is responsible in mines and quarries: respiratory diseases, waterborne diseases, infectious and malformative diseases.

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Introduction

Mining is one of the most important sources of heavy metals in the environment. High levels of these metals can be encountered around and in metalliferous mines, due to the dumping and dispersal of mine tailings in nearby agricultural soils and in watercourses. This eventually constitutes a potential risk for the inhabitants of the mining regions (Lee, 2001) ^[7]. In DR Congo, the artisanal mining sector remains to this day, at the center of mining policy, it has beneficial effects, presumed or real, but also deleterious effects that can have repercussions from an environmental and health point of view Considerable. Among the beneficial effects of artisanal mining, we can note the liberalization of the sector and the employability of young people. Among the deleterious effects of artisanal mining, we can cite diseases (respiratory, water-borne, infectious and malformative as well as lead poisoning) and air, soil and water pollution.

It was noted that the sector located under the trade winds of the South-East presents soils, air enriched in lead, and other heavy

metals, by the fallout of metalliferous dust emanating from the Kalukuluku quarry (Kasanya *et al*, 2022)^[4] and the Likasi road (Muyumba, 2014)^[11].

Situation responsible for the bleeding of the nose of the inhabitants of the Ruashi and Kampemba communes and the replacement of the original clear forest of Miombo, by a short steppe within which one finds many species of cupricultural flora (Malaisse, 1997)^[8] as well as large areas of bare ground. Failure to comply with the provisions relating to the mining law by the entities entrusted with the management of artisanal mining makes the ores of the Kawama quarry traps for various waste enriched in Metallic Trace Elements (MTE). Since the artisanal diggers and the organs entrusted with the management of the artisanal mining work in violation of the mining law and other laws relating to the management of the environment, the pollution of the environment and the diseases by populations living near the quarry are possible and should be the subject of an in-depth study. Thus, the inhabitants residing in the vicinity of Kiwele and Changwe avenues exposed to chemical pollutants due to the transport of mining products from the Kalukuluku quarry were bleeding from their noses and presenting cases of respiratory diseases (Kasanya, 2016)^[3]. In the United States and Canada, an increase in cases of respiratory disease has been noted among women aged 35 to 75 residing in the vicinity of electrical copper smelter facilities (Mattson & Guidotti, 1980)^[9]. The African consulting engineering group S.A. "GAIC S.A." (2015)^[1] who had assessed the impact of environmental liabilities in the provinces of Katanga and two Kasai had found that some women residing in the vicinity of certain quarries gave birth to babies with congenital malformations. The purpose of this study is to analyze the problematic situations relating to environmental management in the mining sector.

2. Materials and Methods

To collect our data, we conducted a survey with a semi-open and directional questionnaire. This survey method was supported by observation, interview and documentary analysis techniques.

2.1. Study Sites and Sampling

2.1.1 Study site

We conducted our search in Kawama village. Geographically, this site looks like this:

To the east, the Kawama village is bordered by the Kimbeimbe health area, to the west by the Tumbwe health area, to the north by the Kafubu health area, to the south by the railway line going from Lubumbashi to Likasi. It is a village which is located 20 km on the Likasi road and slightly far from 2 km from the Lushishi Monastery, crossed by a river bearing the same name which runs around the Lukuni mine in the Democratic Republic of Congo.

2.1.2 Sampling

To carry out our study, we worked with a sample of 252 artisanal diggers working in the Kawama village. We assigned each of the artisanal diggers a number (noted on a piece of paper). Afterwards, we cut and folded these numbered papers, then put them in a ballot box. We did a random draw. At the end, the random sampling showed the names of 252 retained diggers.

2.2 Statistical analysis

The questions posed offered respondents a choice of answers, the number of which varied from four to six. The means obtained were subjected to univariate analyzes of variance (ANOVA) with the statistical software XLSTAT-Pro 7.5. The independent variables were the studied variables and the choice of the category of the affected disease constitutes the dependent variable.

3. Results and Discussion

The results relating to the distribution of the diggers surveyed according to age are shown in Table I.

Table 1: Distribution of diggers by age

Age (years)	frequency	%
<18	48	19,0
18-40	183	72,6
41-60	17	6,7
>60	4	1,6
Total	252	100,0

It follows from Table I that most of them are between 18 and 40 years old (72.6%); they are adults likely to practice this artisanal mining profession to meet the needs of their families. Just by this last element, we think we know that they have information on the diseases that would arise within their families.

The results of this same table indicate the presence of minors in harmful activities who do not even attend school or even (19.0%). Our results corroborate those of UNICEF (2021)^[13] which had found that the work of children associated with mines represents a higher level of danger than any other form of work, while reporting that children in Lualaba and South Kivu were compelled to work. Harmful in economic activities (in agriculture, mining, trade and transport) and household chores. This could be explained by the fact that the status of survival or residence with parents has an influence on the involvement in harmful economic activities, since children whose parents are poor tend to be more concerned with the sector artisanal mining.

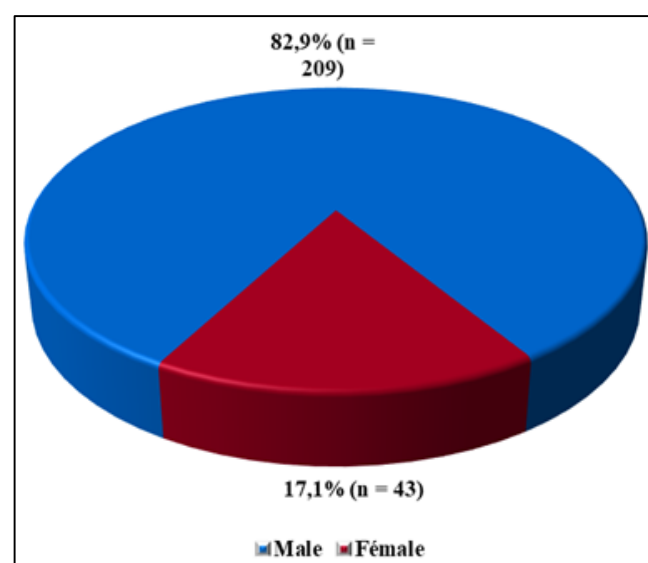


Fig 1: Distribution of diggers by gender

This figure shows that 209 diggers or 82.9% were male against 43 diggers or 17.1% who were female. It is nevertheless shocking that young girls exposed to dangerous working conditions consisting of carrying heavy loads, working with machinery, exposure to dust, smoke or gas, noise, temperature or moisture, working with dangerous tools, being involved in underground work, exposure to low light, chemicals, physical abuse or emotional abuse. It was indeed, identified three main practices (very painful) namely: "Ku pomonona: destruction of the ground", "Ku tandulula: to open the ground" and that of "Ku tosheleleya: to untorpedo the ground". Each practice constitutes a lexico-semantic language that emanates from a natural category (Mwelwa, 2016) ^[13]. It is really time for organizations for the protection of women's rights to look into this abnormal situation. We have identified a relationship between the proportion of minors and women or girls exposed to dangerous working conditions [$F(3.2888)=8.0$; $p<0.001$]. Women whose husbands or parents are poor are indeed the most affected by this arduous work.

Table 2: Distribution of diggers by place of origin

Place of origin	Frequency	%
Kawama	161	63,9
Lubumbashi	97	38,5
Elsewhere	72	28,6
Total	252	100,0

Table II presents the distribution of the diggers according to origin, it appears that 161 diggers or 63.9% were indigenous (resident of Kawama) followed by 97 diggers or 38.5% who came from the city of Lubumbashi and 72 others diggers, that is 28.6% from surrounding villages or other quarries. This observation is identical to that of the Ministry of Employment (2007) ^[11] which had realized that in urban areas, the proportion of children to be involved in mining and quarrying activities, regardless of the wealth quintile, is significantly higher lower than in rural areas. This could be explained by the fact that in town children are more absorbed in school activities than in immediate income-generating activities. We found a relationship between the proportion of diggers and their place of origin [$F(3.4212)=6.0$; $p<0.001$], very few diggers actually come from urban areas.

Table 3: Distribution of diggers according to professional experience

Professional Experience (years)	Frequency	%
≤ 2	48	19,0
3-5	17	6,7
>5	183	72,6
Total	252	100,0

It follows from table III that out of 252 registered diggers, 183 or 72.6% had more than 5 years 'experience. Just by this element, we think we know that they could have knowledge of the risk related to the profession in terms of environmental pollution. And they could also have an idea about the diseases that would arise in case of environmental pollution. These results corroborate those of Kisanguka (2009) ^[5] who found that parents who had a seniority of more than 5 years had experience in the treatment of waterborne diseases that arose within their household and also presented an opinion on the perception of water pollution.

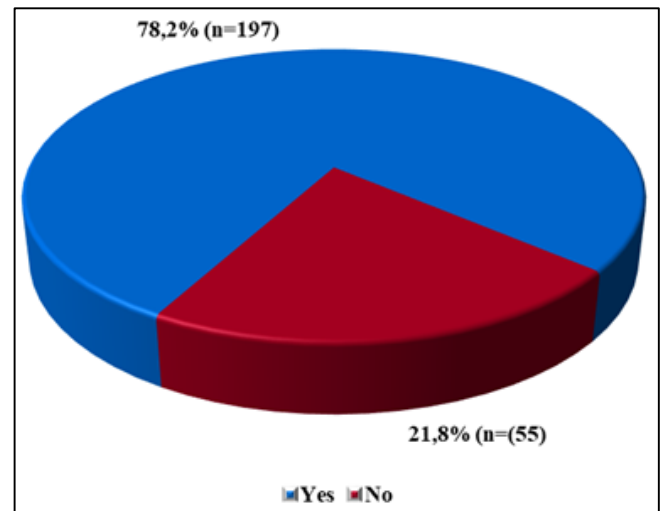


Fig 2: The distribution of diggers according to knowledge of the risk linked to the profession following environmental pollution

It emerges from this figure that 197 diggers or 78.2% were aware of the risk linked to environmental pollution. This observation is also identical to that of Kisanguka (2009) ^[5] who found that the heads of households surveyed, essentially made up of experienced elders, had knowledge of water management in their households.

We have identified a relationship between the seniority of the diggers and knowledge of the risk related to environmental pollution [$F(3.3435)=7.0$; $p<0.001$], the diggers having a seniority of more than 3 years have indeed a knowledge on the risk related to the environmental pollution.

Table 4: Compliance with the provisions relating to the mining law by the structures entrusted with the management of artisanal mining

Respect de la loi minière	Frequency	%
No	248	98,4
Yes	4	0,6
Total	252	100

After a careful analysis of the results of Table IV, it emerges that more than 98% of the diggers claim to have witnessed the non-compliance with the provisions relating to the mining law by the entities entrusted with the management of the artisanal mining. This would make it possible to fight against the illicit practices maintained by traders at the level of artisanal mining sites up to the counters for the purchase and sale of minerals. He lets himself see the presence of expatriates in this supply chain, which is typically contrary to the new law. It is in this sense that the rigging of the weights and contents of the ores is observed, which constitutes a shortfall for the artisanal miners as well as for the Congolese State. However, the establishment of an appropriate governance system through the new mining law of 2018 makes it possible to take into account the risk that mining operators run on their lives as well as that of the surrounding communities.

It was noticed a lack in the popularization of legal texts among artisanal diggers and in the formalization of all artisanal mining sites. Thus, the establishment of a distinction between the sites of (illicit) facts whose EP (exploitation permit) belong to Gécamines and the virgin AEZ (artisanal exploitation zones) becomes a necessity (Mwelwa, 2016) ^[13]. In addition, it was found that the track record of mining

reforms has not had a positive outcome from an environmental, social and human rights perspective. This is how (Mazalto, 2010)^[10] indeed points to a negative impact due to mining in this artisanal sub-sector. And more specifically, the impacts in relation to water, health, food and habitat analyzed in this work illustrate the risks on the populations living around the mining sites.

Thus, to oversee this artisanal mining sector so that it is profitable for the local community and participates in the country's economy, several technical and financial partners, non-governmental organizations, both national and international, as well as other actors acting as a pressure group strive to push the country's authorities to adopt strategies and mechanisms that would limit cross-border mining fraud and smuggling (Kitobo, 2022)^[6]. And that the establishment of trading centers in accordance with the revised Mining Code would make it possible to channel the markets for strategic mineral substances in the region, which are mainly copper and cobalt, for the benefit of artisans and the State.

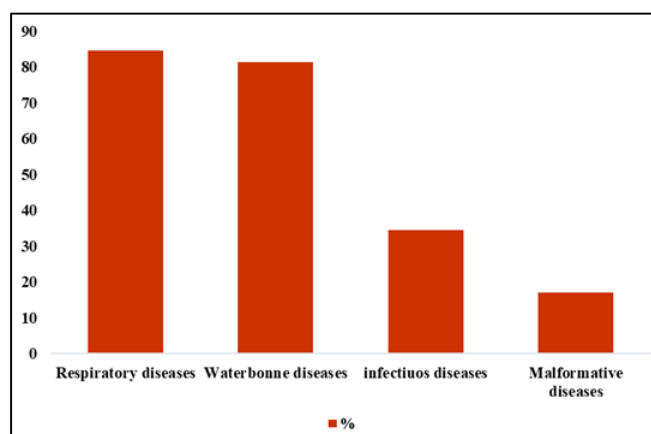


Fig 3: Distribution of diggers by suspected diseases related to environmental pollution

Figure 3 presents the results relating to the distribution of diggers according to suspected diseases related to environmental pollution. It emerges that environmental pollution in the mine is more responsible for respiratory diseases followed by waterborne diseases and finally infectious and malformative diseases. These results are identical to those of Kasanya *et al* (2022)^[4] who found that residents living in the vicinity of Kiwele and Changwe avenues exposed to chemical pollutants due to the transport of mining products from the Kalukuluku quarry were bleeding from the noses and presented with cases of respiratory diseases (Kasanya, 2016)^[3], this observation is also identical to that of the African consulting engineering group “GAIC S.A.” (2015)^[1] who realized that some women residing in the vicinity of certain quarries in the provinces of Katanga and two Kasai gave birth to babies with congenital malformations.

Conclusion

This study aims to overcome the lack of evidence / data on the situation of diggers in the mining areas of Kawama village in order to better understand the environmental problem of diggers in a situation of deprivation of their human rights guaranteed by the mining law in proposing recommendations that best respond to the situation. The

results indicated the significant presence of children compelled to harmful work in the economic activities of mines and quarries.

The study also identified several environmental and health issues related to environmental management in this sub-sector of artisanal mining. Thus, it is interesting to note that these diggers from the Kawama village still have a more assertive perception of this pollution, which is why they cite the following diseases for which this pollution is responsible in the mines and quarries: respiratory diseases, waterborne diseases, infectious and malformative diseases.

Based on our results, we were able to confirm that the artisanal mining sector is a source of pollution responsible for the several diseases suffered by the diggers of the Kawama village. We believe that other studies should determine the quality and quantity of ETM in quarries to minimize the risks of TME impregnation and to put in place adequate techniques for reducing the soil-plant transfer of TME to avoid the risks contamination of the food chain by toxic metals.

Thus, on the basis of these results, the following recommendations can be made, the aim of which is to improve the situation of diggers:

- Sensitize parents as most children are found to be workers in quarries;
- Implement programs to improve the social status of diggers as work is linked to household poverty while paying particular attention to households with children whose parents have limited means;
- Address the issue of hazardous work among children, especially in mines and quarries where children find themselves working in extremely dangerous conditions that are detrimental to their health and development.

References

1. GAIC SA. Evaluation de l'impact du passif environnemental au niveau des provinces du Katanga et des deux Kasai en République Démocratique du Congo, 2015, 68.
2. Gaspard C. Etude empirique : définitions, méthodes, analyse et exemple, Scribbr 2019). Consulté le 20 Décembre 2022, url: <https://www.scribbr.fr/methodologie/etude-empirique>.
3. Kasanya KJ. Evaluation de la pollution due au transport des produits miniers; cas de CHEMAF dans les communes Ruashi et Kampemba. Mémoire de Licence. Département de Chimie-physique, ISP-Lubumbashi, 2016, 33-52.
4. Kasanya KJ, Mwenge KR, Kabey YKC, Kajila KG, Mutete SA, Kipampe KS, *et al*. Evaluation of pollution due to the transport of mining products; case of CHEMAF in Ruashi and Kampemba communes; IJMRGE. 2022; 03(05):282-288.
5. Kisanguka MU. Perception de la pollution de la rivière Kafubu par les riverains, mémoire de DEA en santé publique; UNILU, 2009, 38-45.
6. Kitobo S. Les défis à relever dans le secteur des Mines de la R.D. Congo, Paris, Harmattan, 2022, 140-150.
7. Lee P. Mise en solution des métaux lourds (Zn, Cd, Pb) par lessivage des sols et sédiments pollués. 2001, 29-56.
8. Malaisse F. Se nourrir en forêt claire africaine. Approche écologique et nutritionnelle. Centre Les presses Agronomiques de Gembloux. (1997), ASBL. Gembloux.1665/3.
9. Mattson G, Guidotti H. Health risks associated with

- residence near primary copper smelter: preliminary report. *Am Ind Med*. 1980; 1(4):355-365.
10. Mazalto M. Gouvernance du secteur minier et enjeux de développement en République démocratique du Congo, Thèse de doctorat en sociologie de l'Université Québec à Montréal, Canada, 2010, 50-70.
 11. Ministère de l'emploi. Fiche de données toxicologiques et environnementales des substances; Cuivre et ses dérivés; Version N°1-5-Février; (RD Congo); 2007, 66.
 12. Muyumba NW. Etude sur l'émission et le transfert dans le sol des éléments traces métalliques en domaine routier; Mémoire de Licence. Département de Chimie-physique, ISP-LUBUMBASHI, 2014, 24-43.
 13. Mwelwa N. Les situations-problématiques relatives à la gestion de l'environnement dans le secteur de l'exploitation minière artisanale au Village Kawama, R.D. Congo. Mémoire de maîtrise Inédit. département de criminologie économique et environnementale, Ecole de Criminologie; Université de Lubumbashi, 2016, 74-80.
 14. UNICEF. Etude sur la situation des enfants dans les zones d'exploitation minière artisanale dans les provinces du Lualaba et du Sud-Kivu; rapport; 2021, 23-82.