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Environmental Problems Associated with Small-scale and Artisanal Gold Mining in Africa

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Introduction

The effects of mining will be a growing concern in the field of environmental research as the need for fossil fuels and mineral resources increases globally. Local communities in Africa have been particularly exposed to the negative consequences of mining contamination on public health, agriculture, and the environment due to economic pressures and a slower development of environmental consciousness.

Description

Additionally, the legacy of mining includes the contamination of hundreds of sites throughout Africa as a result of the adoption of improper mining methods, subpar tailings processing, and subpar mine waste disposal procedures. Modern rehabilitation methods are also not yet widely used in mined-out territories throughout the continent of Africa. to provide an international platform for geochemists, geologists and environmental scientists to present the results of new investigations and studies with a focus on environmental problems related to mining in specific geological, hydrogeological, geomorphological and climatic conditions of Africa [1].

Papers in this Special Issue bring new data and new methods in the assessment of contamination of soils and terrestrial ecosystems, as well as on mechanisms and factors controlling the spread of pollutants during the leakage of acid mine waters and their drainage. Special attention is paid to environmental issues related to small-scale and artisanal mining for gold in Africa. Lack of geochemical "background" data makes it difficult or even impossible in many situations to differentiate between primary mineralization and anthropogenic contamination, which is a difficulty for determining the extent of environmental contamination in Africa [2].

As a result, this Special Issue contains articles that present fresh geological information as well as examples of how accurate threshold values can be computed in a variety of situations. The topsoil and the uncontaminated lower horizon of soil at a depth of 80–90 cm were sampled as part of this geochemical survey for comparison. This made it possible to distinguish between topsoil contamination from dust fallout and the normal presence of the chemical constituents under observation in soils..According to the results of geochemical monitoring, the eastern and northeastern parts of the nearby town were primarily affected by dust fallout. The high amount of gastrointestinal accessible Pb in dust particles and topsoils is the main health danger in this location, according to the analysis of gastric accessible concentrations of potentially toxic elements in topsoil. Modeling the dispersion of dust fallout from the flotation tailings pond revealed that a persistent wetness of the tailings pond's surface can greatly lessen the problem of dust fallout harming the town of Rosh Pinah [3-4].

Geomorphological and Climatic Conditions

The major binding phase for Cu and Pb in tailings and contaminated soils is remarkably similar, according to the findings of successive extraction examinations of the samples. The reducible 1 percent (poorly crystalline oxides, Fe and Mn hydroxides) is where copper and leadare usually bonded. The concentration of both metals in the more accessible, exchangeable, and acid soluble fractions is quite low as compared to the reductible fraction. The distribution of the examined components in tailings and contaminated soils is the same, indicating that tailings pond dust fallout is the cause of soil contamination. The authors also note that samples taken from the tailings pond's surface during the dry season have higher concentrations of potentially hazardous substances than samples taken during the rainy season.

The production of secondary minerals (gypsum and roselite) on the pond's surface, as well as capillary lift in the tailings pond's body, are thought to be the causes of these phenomena. Due to the high carbonate concentration of the flotation wastes, the danger of groundwater pollution was considered to be quite minimal.The environmental challenges connected to this sort of mining are critical topics of concern for all parties involved in the artisanal and small-scale Au mining business in Africa. Many African nations that mine for gold produce a lot of mine waste, including tailings and effluents that contain a lot of potentially toxic substances [5].

Conclusion

This causes a great deal of environmental and human health concerns, which may include land degradation, habitat alteration, and both soil contamination and water contamination In the previous few decades, a great deal of research has been done in the fields of artisanal and small-scale Au mining. They demonstrated that the use of Hg for Au amalgamation posed a health concern to the community.

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