

**Health Risk Management for Heavy Metals In Mine Drainage the Case of Tarkwa  
Mining Area in the Western Region of Ghana**

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**ABSTRACT**

Mobilization of heavy metals in soils and water resources is posing serious health threats in many parts of the world. This study was carried out at Tarkwa mining area in the Western Region of Ghana. The area has a long history of mining and there are fears that the mining activity is causing serious metal pollution to the water resources and soils. The aim of this study was to ascertain the extent of heavy metal pollution of soils and water resources and how that may be impacting on the health of the people. Instrumental neutron Activation Analysis was employed in analyzing soil and water samples obtained from 15 communities within the study area, for arsenic, mercury, cadmium, and lead. A survey was also conducted to examine the exposure pathways of the metals. In addition, medical records at the Tarkwa Government Hospital on reported cases of cancer, cardiovascular diseases, and kidney problems were reviewed to see how the heavy metal pollution possibly reflects in the medical history of the people in the area. The results showed that arsenic, cadmium, and mercury levels in soils were within limits set by the International Atomic Energy Agency Soil-7 (IAEA-Soil-7) except for isolated cases at Old Town, Akyempim, and Mile 10Yz respectively. Lead was within limits in both water and soils at all the sampling stations. The concentrations of arsenic, mercury, and cadmium in water however, were above the WHO guideline values at most of the stations especially, Akoon, Akyempim, Mile 7, Mile 8, Mile 9, and Mile 10Yz. The highest concentrations recorded were: As- 2.14 mg/l as against the WHO guideline value of 0.01 mg/l; Cd- 0.55 mg/l as against 0.003 mg/l; and Hg- 5.09 mg/l as against 0.001 mg/l. These concentrations occurred in groundwater which, according to the survey, serves as the main source of potable water for the people in the area. The research signalled a possible threat to health: 164 cases of cardiovascular diseases, 109 kidney problems, and 33 cancer cases were recorded over a five-year period (2004-2008) at the Tarkwa Government Hospital. It was suggested, among other things, that testing for heavy metal toxicity should form an integral part of the daily clinical services to ensure early detection to forestall detrimental consequences.

## **Supervisors**

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