

**Impact of Small Scale Mining On Irrigation Water Quality for Vegetable Production: Case Study of Asante Akim Central Municipality**

**ABDUL RAHMAN FAHAD**

**2016**

**ABSTRACT**

Small scale mining is a major threat to water resources and agricultural activities in most mining communities across Ghana. The use of rivers and other water sources for irrigated vegetable farming in Asante Akim Central Municipality has been in existence for a long period and the main factor influencing it is water scarcity. This study investigated the effect of small scale mining on the quality of water for irrigation as well as the concentration of heavy metals in water, soil and vegetable samples from sixteen randomly selected farms in three sites along a river and a dam which was used as a control. The physical and chemical parameters of the water samples were measured using standard methods for water quality analysis (APHA). The samples were digested and assayed for heavy metals through the hot plate digestion principle and the Atomic Absorption Spectrometry (AAS) respectively. Perception of irrigated vegetable farmers on water quality for irrigation was also assessed in four selected communities. One hundred and fifty farmers were interviewed through questionnaire administration using convenience sampling method. The study revealed that the concentrations of the physico-chemical parameters measured from the various sites were all below the Food and Agriculture Organization (FAO) guideline for irrigation water quality except turbidity (35.2 – 125.6 NTU) and potassium (12.89 – 16.3 mg/l) which were higher than the permissible limits. The water was classified as suitable for irrigation base on the sodium adsorption ratio (SAR), US Salinity laboratory classification and the Wilcox diagram for irrigation water quality. With the exception of mercury and cadmium which were higher at some sites, all the other heavy metals measured were below the FAO permissible limits for irrigation. The concentrations of the parameters measured were generally higher at the sites along the river as compared to the control; this indicates the effect of small scale mining on the water quality. However, the effect was not significant on the quality of the water for irrigation. The detection of

some level of heavy metals in the water should be a major concern to the various stakeholders in the Municipality as continues influx of small scale miners in the area could increase heavy metal concentration beyond the acceptable threshold. The concentration of heavy metals measured in the soils and vegetables were below the FAO and WHO guidelines respectively. The results from the survey reveal that 62% of the farmers had negative perception about the quality of the water used for irrigation. Majority of farmers used river as their source of water due to the availability of the water throughout the year. Additionally, about 69.3% of farmers believed water quality has no implication on vegetable quality. It is recommended that farmers in the study area are sensitized on the need to use good water for irrigation to prevent contamination of vegetables and avoid health hazards.

**Supervisor**

**Dr. Daniel Nukpezah** (Principal Supervisor)

**Dr. Ted Yemoh Annang** (Supervisor)