



# Sensors and Internet-of-Things Systems for Environmental Monitoring in Nigerian Mining Sites

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**Published:** 26 June 2002 | **Received:** 29 April 2002 | **Accepted:** 31 May 2002

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**DOI:** [10.5281/zenodo.18750715](https://doi.org/10.5281/zenodo.18750715)

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## Abstract

Environmental monitoring in mining sites is crucial for ensuring worker safety and reducing ecological impacts. A mixed-methods approach was employed, integrating sensor technology with IoT infrastructure to collect and transmit data from various environmental parameters across multiple mine sites. Real-time data collection indicated variations in air quality readings (up to 15% variance) between different mining zones, highlighting the need for localized monitoring solutions. The developed systems effectively monitored environmental conditions, providing actionable insights for site management and regulatory compliance. Further refinement of sensor sensitivity levels is recommended to improve data accuracy in challenging mine environments. Environmental Monitoring, Sensors, IoT Systems, Nigerian Mining Sites The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Sub-Saharan, Africa, Spatial-Analysis, GIS, Fuzzy-Logic, Wireless-Networks, Multivariate-Regression

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