## Transforming Environmental Justice: AloT-Driven Open Data Systems for Public Health in Open-Pit Mining Zones

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## Abstract

Surface coal mining poses significant environmental and public health challenges, especially in vulnerable regions such as the Caribbean mining corridor in Colombia. This study proposes a participatory model for managing environmental and climate risks, leveraging Artificial Intelligence of Things (AIoT) networks and guided by principles of environmental and climate justice. Based on the findings of the *Hub Ambiental del Caribe* project, the framework prioritizes the deployment of AIoT networks in high-risk areas, starting with 90 nodes distributed in three pilot municipalities: Algarrobo (Magdalena), La Jagua de Ibirico (Cesar) and Albania (La Guajira). Each node monitors air quality (PM10, PM2.5), noise, vibration, and meteorological variables, generating real-time data for predictive modeling. The open data platform ensures transparency, enabling communities to access information and participate in decision-making. By fostering civic oversight, participatory governance, and citizen science, the framework strengthens resilience and promotes equitable environmental management. The study emphasizes the scalability of this model, highlighting its potential for global expansion to other areas impacted by climate change. This innovative approach integrates technological advancement with social inclusion, aligns sustainable development goals, and paves the way for resilient and equitable urban environments.