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Spatial Distribution of Respirable Particulates and Toxic Heavy Metal Pollutants in Nairobi CBD Area Ambient Air: Identification and Quantification of Pollutant Sources Impacting on the Air Quality

Air pollution has become a worldwide concern threatening public health and sustainable developments goals (SDGs). The Global Burden of Diseases GBD 2015 (GBD Risk Factors Collaborators 2016) classified respiratory particles as the fifth risk factor for causing death around the globe. The increase in population, industrial activities, vehicular emission and traffic, growth of construction buildings and roads, and waste burning, have contributed extensively to air pollution in most cities in SSA.

This study assesses the variation of respirable PM2.5 concentration levels and heavy metals pollutants in aerosols samples collected within Nairobi Central Business District (CBD), measured to determine sources impacting on ambient air quality.

Five selected sites within CBD were sampled concurrently for air quality parameters; particulates and meteorological data for 10-12 hours daily, for two months. 55 air particulate filter samples were sampled using personal cyclone samplers and analyzed for particulate mass concentrations and toxic heavy metal pollutants using EDXRF method.

The elemental data will be statistically analyzed using Positive Matrix Factorization method for pollutants source identification and quantification impacting on air quality.

The PM concentrations ranged from 15.38µg/m3 to 180.76µg/m3. The elemental concentrations varied significantly. Ca, Mn, Fe, Ni, Cu, Zn, Sr, Zr, Nb and Pb, were major pollutants contributors of air pollution to ambient air.

The study is relevant in air quality management, to understand the risks of poor air quality and mechanisms responsible for it, and to pin-point probable technological outcomes that would aid in mitigation in Nairobi CBD.

Key-Words- Air pollution, (SDGs), particulate matter, SSA.

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