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Comprehensive Assessment of Air Pollution and Air Quality Index (AQI) in Residential Areas: A Case Study in Ikere-Ekiti

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Introduction: A rising worry is the deterioration of outdoor air quality, especially in urban residential areas. The main topic of this work is the measurement of significant air pollutants outdoor at Ikere-Ekiti, Nigeria, such as CO2, NO2, O3, PM1, PM2.5, and PM10, as well as their correlation with the Air Quality Index (AQI). Research Question: This study's main research question is: What can be learned through continuous monitoring with an inexpensive sensor regarding how different CO2, NO2, O3, PM1, PM2.5, and PM10 concentrations affect the computed Air Quality Index (AQI) in a residential area? Methodology: In an apartment building in Ikere-Ekiti, a month-long surveillance monitoring was carried out. Pollutant concentrations were measured using a low-cost sensor, and the AQI values were calculated using the information obtained. Results and Discussion: High levels of CO2 (582.74 ppm), NO2 (177.68 ppb), O3 (68.01 ppb), PM1 (9.28 μg/m³), PM2.5 (13.17 μg/m³), and PM10 (14 μg/m³) were found in the results. The AQI values highlighted the potential health concerns linked to the detected pollution levels by indicating air quality ranging from moderate to unhealthy. Conclusions: The findings offer insightful information about the dynamics of air pollution and its effects on a household setting. The study highlights the value of inexpensive sensors for monitoring the quality of the air in real time and highlights the necessity of focused interventions to reduce pollution and enhance the well-being of locals in cities like Ikere-Ekiti.

Keywords: Air Pollution, Air Quality Index (AQI), Case Study, Comprehensive Assessment, Ikere-Ekiti, Residential Areas.

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