



# Solutions for Industrial Pollution Control in Zambia: A Methodological Framework

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## Abstract

Industrial pollution in Zambia poses significant environmental challenges, necessitating robust solutions to mitigate adverse impacts on public health and ecosystems. The study employs a mixed-methods approach combining quantitative data analysis with qualitative field studies. A Bayesian hierarchical model is utilised to predict pollutant dispersion patterns across different regions of the country. Predicted pollutant concentrations show a clear gradient from urban centers to rural areas, indicating that targeted interventions are most effective in high-pollution zones. The methodological framework provides a robust tool for policymakers and engineers to prioritise pollution control efforts and ensure equitable environmental protection across Zambia. Implement the identified solutions based on the model's predictions and incorporate stakeholder feedback into ongoing policy development. Industrial Pollution, Environmental Engineering, Zambian Policy, Bayesian Hierarchical Model The maintenance outcome was modelled as  $Y = \beta_0 + \beta_1 X + u_i + \text{varepsilon}$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** *Zambian, Geographic Information Systems, Sustainable Development Goals, Environmental Impact Assessment, Case Study Methodology, Regression Analysis, Stakeholder Engagement*

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