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STRATEGY TO SITUATE AIR QUALITY MONITORING STATIONS IN AREQUIPA INDUSTRIAL PARK

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Abstract

Industrial development in urban areas is a continuing problem for citizens and industries because of the constant air pollution complaints and respiratory illness. There is a lack of data in Arequipa for the environmental guidance of air quality and public health protection. The strategy proposed in this report is to determine the optimal locations of monitoring stations in Arequipa Industrial Park. Using the analytic hierarchy process (AHP), we evaluated their relative preferences for locating each monitoring station. The strategy includes three main activities: 1) identification of land use (i.e., industrial, bus station, urban), and data collection (meteorology, chemical pollutants), 2) development and a hierarchy of criteria by AHP, and 3) design of the monitoring network by weighted overlay and geographic information system methods. First, three sustainable criteria (environmental, social, and economic) are evaluated with nine sub-criteria. Afterward, with the assigned weights, we obtained a random index of 0.58, a consistency index of 0.04, and a consistency ratio of 0.07. With this confirmation, sustainability was prioritized as follows: environmental (61.9%), social (28.4%), and economic (9.6%). Finally, we propose a monitoring network sustainability; it includes three monitoring stations. Competent parties can use this proposal to develop a rapid diagnostic capacity for both pollution episodes and impact the health of the industrial park Arequipa population.

Keywords: Analytic Hierarchy Process, geographic information system, multicriteria analysis, optimal locations, sustainable criteria

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