

DETERMINATION OF AIR QUALITY MANAGEMENT ZONES USING GIS-BASED FRAMEWORK TOOL FOR URBAN PLANNING IN QUEZON CITY, PHILIPPINES

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Air pollution has been a growing concern in urban areas because of the direct impacts to its population. With this, the importance of proper urban design has become more emphasized to reduce human exposure to air pollutants. In the Philippines, there is a limited number of studies that evaluates urban morphology and air quality. In addition, there is no clear and data-driven delineation of airsheds – defined in the Philippine Clean Air Act as areas with similar climate, meteorology and topology – which affect the interchange and diffusion of pollutants in the atmosphere. This study proposes a technical approach in determining physical boundaries or air quality management zones (AQMZs) to complement the monitoring of airsheds using a GIS-based framework tool applied in one of the biggest cities in the Philippines. The specific objectives of this study are (1) to apply the formulated theoretical framework for the management of urban ventilation potential and human exposure to air pollution, (2) to include air quality datasets and local climate zones (LCZ) in the analysis, and (3) to map out areas in the pilot site, which is Quezon City, that requires stricter monitoring due to decreased ventilation potential and increased human exposure to pollution. A 200x200m grid was used to determine urban morphological characteristics using zonal statistics and join layer by summary. Preliminary results show that places with megamalls, marketplaces and commercialized spaces are associated with high plan area densities, gross floor area ratios and low building height variations, which makes them associated with decreased ventilation potential. The eastern side and central parts of the city contains high gross floor area ratio, while the western and southeastern parts have a high plan area density, and the building height variation is generally low for most parts of the city. Determining AQMZs at localized levels can yield better strategies for environmental or land use planning.

Keywords: urban morphology, air quality management zones, local climate zones, GIS