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DMSAT-1 CASE STUDY- A REMOTE SENSING AND GIS APPROACH FOR ENVIRONMENTAL
GREEN AREAS PLANNING USING DUBAI MUNICIPALITY SATELLITE IMAGERY, DUBAI-UAE

Abstract

Over the last decade, Dubai emirate witnessed a vast, rapid growing population that doubled since 2008. Nowadays, Dubai consider as the most populated emirate within the United Arab Emirates (UAE). With such increasing population, and new urban developments, sustainable urban planning procedures play an essential role in Dubai's environmental quality such as air quality, and pollution. Therefore, this study will utilize Remote Sensing and Geographic Information system (GIS) to investigate Dubai's environmental quality by addressing and locating green areas and its percentage compared to population as standardized by the World Health Organization (WHO) for a healthy living. The study methodology is divided into three steps. First, Dubai Municipality Satellite (DMSAT) medium spatial resolution, and multispectral imagery will be used as an input for segmentation and object-based analysis. Considering the spectral and spatial signatures for green areas machine learning techniques will be adopted to select the most significant features to classify and extract green areas. Second, using environmental relational indices, green areas percentages will be quantitatively compared to DMSAT air quality maps, such as Aerosols Index (AI), NO₂ and SO₂, as well as the population density maps. Finally, GIS will be used to create Dubai Environmental Critical Map (DECM), in order to locate districts with limited green areas and high pollution to improve environmental standards. The study results can be used as a measure for the municipality policy makers to ensure sustainable urban development, and to follow WHO environmental standards.