Impact of North Gas Field Development on Landuse/Landcover changes at Al Khore, North Qatar, Using Remote Sensing and GIS

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Abstract

Four dates of satellite images are utilized to monitor landuse/landcover changes at Al Khore municipality following discovering of the North Gas Field at the Northeast coast of the state of Qatar. Ras Laffan Port has been designed and purpose built primarily as the export facility for Liquefied Natural Gas (LNG) derived from the processing of gas landed from the North Field Gas Reservoir situated 67 km NNE of the Port. Remote sensing data includes, MSS 1977, Landsat Thematic Mapper 1988 and 2000 and IRSS 2008. The rapid increase in population over the last three decades is attributed to the strong performance of the economy. At Al Khore, number of population increases from 31,547, 4.2% of total population in year 2004 to 50,917, and 6.1% of total population in year 2006. Production Capacity of Ras Gas from the Liquefied Natural Gas (LNG) increases from 6.6 million tons in year 1999 to 35.7 million tons in year 2012. Change detection is processed to assess the impact of Ras Laffan harbor on coastal changes. The most appropriate band combination, band ratios and images classifications were specified to enhance land cover in each image data. ArcGIS.9.3 is used to analyze, map and assess the current urban and regional planning. The results indicate that Al Khore master plan comes in response to rapid development of the state of Qatar, the most suitable regional plan is suggested for sustainable development.
Spectral enhancement of the SPOT imagery data to assess marine pollution near Port Said, Egypt

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Abstract

Satellite image data were used to detect, monitor and map different pollutants at five study sites along the El-Gamil beach including; El-Debbha, El-Manasra, El-Fardous and El-Gamil inlets and the El-Gamil airport. The images were rectified and analyzed by ERDAS IMAGINE 8.7. Image processing techniques were applied using ENVI 4.2 to analyze the SPOT image data (10 m resolution) for 2006. Image enhancement, principal component analysis (PCA), band ratios and supervised/unsupervised classifications were applied. Surface water samples were collected during the winter of 2005 and the summer of 2006. Water contamination was found to be higher in the summer than in the winter. SPOT image data from the summer, therefore, was selected to verify the results of metal analysis. Different pollutants detected along the El Manasra and El Debba sites are associated with industrial development, and discharge from natural gas companies and electric power generating stations. Significant water pollution is not unique to this region of the Mediterranean Sea, but is increasingly common at coastal locations throughout the globe. To protect both the marine environment and commercial interests that depend on clean water and beaches (e.g., beach resorts), effective wastewater management practices must be designed, implemented and maintained, along with reasonable development policies. Remote sensing may be an important tool for monitoring the effectiveness of any pollution mitigation strategies.

Keywords: band ratios, image processing, principal component analysis, spectral enhancement, supervised/unsupervised classification and water pollution