

Remote Sensing Based Land Degradation Monitoring In Bolgoda Lake and River Network, Sri Lanka

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Abstract

The rapid utilization of remote sensing satellites and techniques has provided a reliable, effective, and near real time possibilities to characterize terrestrial ecosystem properties. Water body extraction by using remote sensing has been the most significant method in the investigation of water resources. Remote Sensing Satellite images can play a significant role in investigation, dynamic, monitoring and planning of water resources. In this paper, a study has been conducted to detect the changes in water body extent during the period of 2008 to 2017. Bolgoda lake and river network were selected as the study area to monitor and analysis the changes of the water body. Multiple methods including supervised classification (Support Vector Machine (SVM)) and vegetation index method (Normalized Difference Water Index (NDWI), Modified Normalized Difference Water Index (MNDWI), and Normalized Difference Vegetation Index (NDVI)) are analyzed in order to maintain the accuracy and cross check of the outputs. Landsat-5 Thematic Mapper (TM) imagery and Landsat-8 Operational Land Imager (OLI) have high spatial, temporal and multispectral resolution and therefore provides reliable and accurate data to detect vicissitudes in extent of water bodies. This study discovered an extensive variation in water surface and vegetation of the Bolgoda area over a span of 09 years. It revealed that 6.95% percentage of water area significantly degraded due to various causes around the study area during past decade. As well as it also indicate 8.95% percentage decline of vegetation in the area at the same time. In contrast, it also revealed that 28.81% percentage of built up areas were expressively increased between the time periods. Rapid urbanization and development of study area during the past decades has posed a serious threat to the presence of ecological systems. There are identified numerous pressing problems in the Bolgoda area that could lead to decline of the quantity and quality of the habitat, such as cleaning of vegetation, specially mangrove areas for developmental activities, encroachment and illegal constructions , filling parts of wetlands for developmental activities , pollution from solid waste dumping, industrial effluents, household sewage and so on.

Keywords: Landsat, MNDWI, NDVI, NDWI, SVM

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