WATER FEATURE EXTRACTION AND CHANGE DETECTION USING REMOTE SENSING TECHNOLOGY

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Anuradhapura which is situated in dry zone area, is one of the major agricultural areas of the country with wide range of agricultural crops being cultivated. There are many tanks, which were built by ancient kings still in use for agricultural purposes. Area extent of surface water of these water bodies vary with time as a result of both natural processes and human practices. Therefore, it is essential to monitor them for agricultural management and other planning activities of the area. Remote Sensing technology can play a significant role in modeling spatiotemporal changes of surface water resources. In this study, the surface area changes of some important water features of Anuradhapura district during the period of 2000–2016 were investigated using the multi-temporal Landsat 5-TM, 7-ETM+ and 8-OLI images. Different satellite-derived indices including Automated Water Extraction Index (AWEI), Normalized Difference Moisture Index (NDMI), Normalized Difference Water Index (NDWI), Modified NDWI (MNDWI) and Normalized Difference Vegetation Index (NDVI) were calculated from Landsat data to evaluate their performances for the extraction of surface water. The images were classified in to two classes, land and water by applying a land-water threshold manually. Through trial and error method and comparison to reference maps, proper land-water thresholds for each index were determined. Absolute error and overall accuracy were calculated to assess the accuracy of the results. Best index for water feature extraction from Landsat data was selected after analyzing accuracy assessment. The best performances was observed in AWEI in comparison with other indices. Therefore, the spatiotemporal changes of the selected water features were modelled using the AWEI. During the study, changes in the surface area of water bodies were observed in three different time periods; from year 2000 to 2007, from year 2007 to 2010 and from year 2010 to 2016. It could be identified that the fluctuation of surface area changes of water features does not indicate a specific pattern during these three periods in almost all the selected water features.

Keywords: *AWEI, Change detection, Landsat, Surface water*