DETECTION OF MANGROVE CHANGES USING MULTI TEMPORAL SATELLITE DATA: EFFECT OF SHRIMP CULTIVATION IN NORTH WESTERN PROVINCE

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A multi temporal study using Landsat MSS, Landsat TM, Landsat ETM and Landsat OLI images from years 1975, 1987, 2000 and 2014 respectively was carried out to detect changes of mangroves in surrounding area of Chilaw lagoon in North Western province in Sri Lanka. Seven land use classes were identified to produce thematic maps based on unsupervised classification technique and digitization of satellite images. Tasseled cap transformation has been applied to all images for achieving better image classification accuracy by enhancing the visualization of wet surfaces and mangrove vegetation during assigning the land use categories. The overall classification accuracies of images ranged from 60% (Landsat MSS) to 90% (Landsat OLI) while the producer's and user's accuracy of mangrove class ranged from 42%-100%. Extent of each land use class was obtained and temporal changes of mangroves were analyzed specially with respect to shrimp farms. Spatial extent of mangroves in each year were calculated as 383.2 ha (1987), 341.6 ha (2000) and 341.4 ha (2014) and negative trend in mangrove cover was observed. The average annual loss of the mangrove cover was 1.55 ha and deforestation rate of mangrove cover was 0.43 % (using 1987-2014 data). Intensive shrimp farming and urbanization were identified as the main causes for depletion of mangroves. Around 455 ha of shrimp farms were determined from the 2014 images mainly emerged with the expense of mangrove sites. A low ratio of existing mangroves to shrimp farms (1: 1.33) was obtained indicating an adverse impact of shrimp farming on mangroves and thereby on environmental sustainability within the study area.

Key words: Remote sensing, Change Detection, Mangroves, Environment, Classification, Shrimp farming