Evaluation of SDI, NDWI, NDMI and AWEI indices in coastline extraction and water body area of Shadegan wetland

Maryam Aghamiri[1]
Zahra Azizi[2*]
Jalil Imani Harsini[3]

1. Master Student of Remote Sensing and GIS, Faculty of Natural Resources and Environment, Science and Research Branch, Islamic Azad University, Tehran, Iran.
2. Assistant Professor, Department of Remote Sensing and GIS, Faculty of Natural Resources and Environment, Science and Research Branch, Islamic Azad University, Tehran, Iran.
3. Assistant Professor, Department of Environmental and Forest Sciences, Faculty of Natural Resources and Environment, Science and Research Branch, Islamic Azad University, Tehran, Iran.

***Corresponding author:**
zazizi@srbiau.ac.ir

Received date: 2022.04.30
Reception date: 2022.10.22

Abstract

Wetlands play an important role in environmental, biodiversity and the production of agricultural and industrial products and the impact of climate change and human activities on these ecosystems, required to study and evaluate the surface changes of wetlands. In this study, wetland changes have been evaluated from 2008 to 2018 using satellite images and multispectral water indicators, including the Normalized Difference Water Index (NDWI), Modified Normalized Difference Water Index (MNDW), Normalized Difference Mouister Index (NDMI), Automated Water Extraction Index (AWEI) and two medium resolution sensors (Landsat 7 TM, Landsat 8 OLI), were used. This study was performed on Shadegan wetland, one of the international wetlands in Iran. The results showed that generally all methods had the Overall accuracy ranging from 64 to 89% and the performance of each method was compared with Root Mean Square Error (RMSE). The NDMI index with an Overall accuracy of 89% and the RMSE of 94.52 performed better than the NDWI index with an overall accuracy of 64% and RMSE of 165.98 in shoreline extraction. The resultant maps from Landsat 8 data had higher overall accuracy than those from Landsat 7. Increasing Shoreline Development index (SDI) showed that Shadegan wetland area was describing and length of the shoreline increasing. In this study, wetland change detection in time series, the climate change impacts, accelerated industrial development, and wetland land use and the environmental effects of wetlands were investigated.

Keywords: Multi-spectral indices, Shadegan, Wetland, Water body area.