Pol. J. Environ. Stud. Vol. 28, No. 5 (2019), 3235-3242
DOI: *10.15244/pjoes/94216* ONLINE PUBLICATION DATE: 2019-04-29

Original Research

Analysis of Land Use Land Cover Change Detection of Bostanlik District, Uzbekistan

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Received: 16 January 2018
Accepted: 11 August 2018

Abstract

This paper presents the change detection analysis of two multispectral datasets for the Bostanlik District of Tashkent, Uzbekistan, using Landsat-5 TM data for 1989 and Landsat-8 OLI for 2017. Both supervised classification and maximum likelihood algorithms were utilized for the change detection analysis. Six land use classes were identified: snow cover, bare soil/rock, forest, waterbody, built-up areas and agriculture. The change detection technique showed that within 28 years, significant changes occurred in the classes of the forest, built-up areas, bare soil and snow cover. The presented results might be valuable for the government authorities and stakeholders for future land use planning activities.

Keywords: Landsat, Bostanlik, change detection, remote sensing, Uzbekistan

Introduction

Land use and land cover (LULC) are two different terms generally assessed in combination since the first (physical properties of surface elements) and the latter (human use of land cover) cannot be seen as independent from each other [1, 2]. Consequently, LULC represents the result of human-environment interaction within a given area [3-8], influenced by the dynamics given by climate change processes and socio-economic dynamics [9–11]. Nowadays the most prominent methods are remote sensing techniques for LULC change detection. Multi-temporal remote sensing (RS) based on change detection analysis has repeatedly been used in different aspects of land cover change [12, 13].

RS platforms continuously capture the Earth's surface and decision makers can easily apply satellite imagery to monitor dynamics of change. LULC change analysis using RS techniques gives an opportunity to obtain results with low costs, less time consumption and good accuracy, and geographical information systems (GIS) allow updating results whenever new data is available [14, 15]. Utilization of open source data is a good choice to improve the skills in RS and GIS tools, in particular for scientists from less-developed countries. In this context, Landsat satellite images are frequently used for LULC change detection analysis. With RS data, different change detection algorithms are available and repeatedly applied, such as principal component analysis, fuzzy classification, and post classification methods [16, 17].

Different supervised classification methods are applied for LULC change detection. In this research, we built on research published on LULC change for

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