Monitoring land cover change and urban growth in Kandahar City with the help of the Google Earth Engine platform

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Abstract

In this study, changes in the level and area of Kandahar City, Afghanistan, over a long period were examined using geographical information systems and remote sensing techniques. Over the last few decades, attention has been drawn to the changing pattern of the Earth's landscape through the measurement of land use land cover change and is a focus of national and international study programs. Urbanization can be shown as a process caused by rapid population growth, population migration from rural areas, and economic development. The increase in the demands and needs of living spaces in rural settlements has made it necessary to transform and merge into urban areas. In the analysis phase, the Normalized Difference Built-up Index (NDBI), Modified Normalized Difference Water Index (MNDWI), Normalized Difference Water Index (NDWI), and Normalized The changes that occurred were determined using indices such as the Normalized Difference Vegetation Index (NDVI). From 2000 to 2020, the results showed a significant degree of urban growth at the land use change frontier of Kandahar City. As a result of the classification analysis; While the area of residences built in the city in 2000 was 105264 square kilometers, this area increased to 177330 square kilometers in 2020, which means that the city spreads over a total area of 72,466 square kilometers. According to the analysis, most of this area consists of bare land and agricultural land.

Keywords: Kandahar City, Landsat, Change Analysis, GEE, NDBI, MNDWI, NDWI, NDVI