

Land use change detection using historical satellite images and GIS: A case study of Mai-Nefhi watershed, Eritrea.

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Land use and land cover changes significantly impact agricultural land and its productivity. With the increasing demand for urbanization and industrialization, the conversion of land use into other land use types has become a widespread phenomenon. As a result, soil erosion, and land degradation may happen and agricultural productivity may suffer. Moreover, introducing agricultural technologies like irrigation projects is some of the changes. Therefore, understanding the land use changes in different years is crucial in order to analyze its impact. The study aims to investigate the land use and land cover changes in the Mai-Nefhi dam watershed between 1991 and 2021 to analyze land use and land cover changes. In this study, Landsat 8 satellite imagery is utilized from USGS Earth Explorer for data acquisition. The initial step involves image pre-processing, which encompasses various procedures to enhance the quality and usability of the data. Subsequently, supervised data processing techniques are employed to analyze the acquired data. By applying these techniques, a detailed and comprehensive map of land use is generated, showing the distribution and extent of various land use classes within the study area. Furthermore, change detection analysis is conducted to identify and quantify changes using ArcGIS that occurred between 1991 and 2021. The results show significant land use changes and land cover changes over the study period, with the conversion of farmland to water bodies and other land use types. These changes could be because of the country's irrigation projects to introduce irrigation and make the lands irrigable. The result also shows land use changes over the study period, with the conversion of farmland to shrubland and forest land. The study hints at further research to identify the driving forces for land use and land cover changes. The findings will provide insights into the current state of land use and land cover in the watershed and can inform land management decisions for sustainable development in the watershed and can inform land management decisions for sustainable development in the region.