

## **Abstract**

It is crucial to have up-to-date, accurate data on the Earth's surface's Land Use and Land Cover (LULC) change detection in order to better manage decision-making by knowing the connections and interactions between natural and human events. Using Landsat images, this research examines LULC trends in the Vadodara District of Gujarat during 2002 and 2022. Utilizing the Landsat 7 and Landsat 8 imagery, spatial dynamics of Land use land cover change were quantified. Supervised classification was utilized in this research for LULC. In the Vadodara District region, manual sampling was used to create training sets for LULC classification and sample points for accuracy evaluation were taken. Water bodies, vegetation, urban areas, agricultural land, and barren land were taken as different types of land use and land covers. Classification accuracy was evaluated using a confusion matrix. The error matrices were used to derive the overall accuracies, user and producer accuracies, and the Kappa coefficient (statistics). Overall accuracy for the years 2002 and 2022 was 90% and 88%, respectively. Kappa percentages were 87.5 and 85 percent. The user and producer accuracies of the separate classes were relatively high, ranging from 80% to 100%, which shows that the maps created using satellite pictures and the reference data have a decent level of agreement. The analysis findings indicated that Water, urban settlements, vegetation, agricultural land grew over time. Comparatively, the amount of barren land decreased. The Vadodara District's calculated LULC change maps shed light on how the land changed during the research period. The study also puts light on different indices like NDVI, NDWI and NDBI along with the Land surface temperatures.