

# Mapping the spatiotemporal Land Use/Land Cover changes over the UAE coastline

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## **Abstract:**

The Land Use / Land Cover (LULC) of the UAE has changed tremendously in the past few decades. Since the discovery of oil in the Arabian Gulf region in the 1960s, the Gulf Cooperation Council (GCC) countries, and in particular the UAE and Qatar, have experienced continuous growth in terms of their economies and populations. This growth resulted in huge urbanization that turned the desert into an expansive urban development consisting of residential, commercial, industrial, sports and tourism projects that are supported by intricate infrastructures. Urban sprawl in the UAE is the driving force behind a number of urban environmental issues such as the decrease in air quality and the increase in local temperature. Most importantly, the urbanisation and constructions of artificial islands have also led to the encroachment and pollution of the most sensitive coastal ecosystems and habitats. Therefore, understanding how, why, where and what impact LULC changes are having on the UAE coastline is very crucial and useful. This is particularly significant in equipping planning policy makers with the necessary information they need in order to plan for growth that is more coordinated and controlled.

Understanding how rapid urbanization is affecting coastal areas, would contribute to managing natural resources and monitoring environmental changes. Coastal zones of the world are highly productive, constituting a vital component in maintaining climate and ecosystems. Detection and assessment of terrain features along the coasts is an important task as variations of shoreline ecosystems have a direct impact on economic and industrial growth as well as land management. The monitoring and mapping of coastal zones is a challenging task for sustainable development and environment protection. The purpose of this project is to investigate LULC changes over the UAE coastline using high and medium resolution satellite datasets from past several decades. The LULC change pattern needs to be studied in both, spatial and temporal domains. Remote sensing and GIS techniques will be employed in this project to provide a holistic overview of the LULC changes. Various classification approaches will be tried out to identify best performing algorithms for different ecosystem types based on post-classification accuracy assessment of the results. The

application of sustainable methods in development activities is crucial, particularly in this part of the world with very few natural resources other than petroleum and natural gas.

**Hence, the main objectives of this research are:**

1. To develop effective satellite image classification routines for various coastal LULC classes of the UAE
2. To perform spatiotemporal analysis of coastline LULC changes in the UAE
3. To identify vulnerable areas due to drastic coastline LULC changes and to suggest strategies for sustainable development