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Entitled

BIOMASS ESTIMATION OF MATURE MANGROVE TREES IN THE UAE USING SPACEBORNE REMOTE SENSING TECHNIQUES.

by

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Abstract

Mangrove forest ecosystems play an essential role in diminishing the effects of climate change caused by the increase in carbon dioxide in the atmosphere. Estimating mangrove forest aboveground biomass (AGB) can assist in decision-making for conservation, sustainable use, and protection of these forests. The goal of this research project was to map the AGB of mangrove forests along the coasts of the United Arab Emirates (*UAE*) with the aid of *Landsat-8-9* satellite imagery data acquired in September 2023. 12 AGB estimation models were developed based on the combination of *in situ* measurements and *Landsat-8-9* derived vegetation indices. $AGB = 58975\ EVI^{2.7659}$ was the best model selected with R^2 = 0.8105 and p-value < 0.005. The average percentage error between the calculated and derived AGB values was 22% which allowed estimation of mangrove forest AGB across the entire *UAE*. Maps of AGB and AGC were generated and the total values were estimated to be 1,902,653.231 tons and 894,246.882 tons respectively. The results and findings from this study will be used as a standard methodology for environmental studies for the Arab Satellite 813, an Earth-observation satellite to be launched in Q1 of 2025. The findings could also assist relevant authorities in taking necessary actions, formulating policies, and implementing plans for sustainable management of mangrove forests of the *UAE*.

Keywords: Mangrove Forests, United Arab Emirates (*UAE*), Aboveground Biomass (AGB) Estimation, Vegetation Indices, Remote Sensing Techniques, *Landsat 8* and *9*, Carbon Storage.