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DEVELOPMENT OF INTEGRATION MODEL FOR RETRIEVING OF SOIL ORGANIC CARBON USING SPECTRORADIOMETER AND SENTINEL-2 SPECTRAL IMAGING: A STUDY ON MULA DAM CATCHMENT OF AHMEDNAGAR DISTRICT, (MS)INDIA

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Abstract

Soil Organic Carbon (SOC) is a crucial factor in regulating the dynamics of many agrochemicals in soil as well as helpful indicator of soil fertility. So that it needs to be regularly monitored. A frequent survey over a vast area could be possible with remote sensing. This study develops the integration relation by comparing Sentinel-2 for monitoring and mapping of SOC and SVC HR-1024i spectroradiometer measurements taken in the catchment area of Mula dam reservoir which is in Ahmednagar district, Maharashtra. During the modelling phase, spectral data and satellite data were used in preprocessing and transformation methods. The dataset was divided into two subgroups at random: a calibration subset and an independent validation subset. Results showed that the majority of the locations had adequate prediction accuracy for SOC based on developed model by comparing lab spectroscopic measurements and Sentinel-2. The mean value of observed SOC and estimated SOC were also tested using student t-test, it was found that the t-test gave insignificant results for Brightness Index-2 at 5% level of significance for (n-2) degrees of freedom and t-test was found significant for Brightness Index-1. The findings contribute to the field of digital soil mapping and remote sensing by demonstrating how data fusion techniques enhance predictive performance, supporting informed decision-making for soil conservation, climate resilience, and optimized agricultural practices.

Key words: Sentinel-2, SOC, soil, spectroradiometer

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