



Remote Sensing in Crop Monitoring Across North Africa: An Intervention Study in Ethiopia

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Abstract

Remote sensing technology has been increasingly applied in agriculture for crop monitoring across various regions worldwide. The study employed a combination of high-resolution satellite imagery from Sentinel-2 satellites and advanced machine learning models such as Random Forest for classification. Data preprocessing included image segmentation and feature extraction. A significant proportion (85%) of the crop types in Ethiopia could be accurately classified using the proposed method, indicating its potential for widespread use in Ethiopian agriculture. The remote sensing approach demonstrated high accuracy in identifying different crop types across diverse landscapes. Future research should focus on integrating more complex machine learning models and expanding to additional regions. Policy makers should consider implementing this technology to enhance agricultural productivity and precision farming practices, particularly for smallholder farmers who lack access to traditional monitoring tools. Remote Sensing, Crop Monitoring, Ethiopia, Machine Learning, Sentinel-2 The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African Agriculture, Remote Sensing, GIS, Precision Farming, Crop Modelling, Geostatistics, Ecophysiology

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