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Atmospheric Effects on spatial Crop Yield modelling using Landsat's imagery

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Remote sensing techniques provide the opportunity for optimizing and predicting crop yields in the field of agriculture. Spatially Yield prediction plays a vital role in Agricultural Policy and provides useful data to policy makers. This paper aims at examining the use of field spectroscopy along with Landsat's satellite imagery to test the accuracy of raw satellite data and the impact of atmospheric effects on determining crop yield derived from models using remotely sensed data. Vegetation Indices are vital in Crop Yield modelling since they are used in stochastic or empirical models for describing or predicting crop yield. Leaf Area Index, which is also inferred using VI, is also compared to the real values of LAI that are measured using the SunScan instrument, during the satellite's overpass. The spectroradiometric retrieved Vegetation Indices(VI) of Durum wheat are directly compared to the corresponding VI of Landsat 7 ETM+ and 8 OLI, sourcing from both atmospherically corrected and not corrected satellite images in order to test the effects of atmosphere upon them. Crop Yield is finally determined using the Cyprus Agricultural Research Institute's Crop Yield model for Durum wheat, adapted to satellite data, and is used to examine the impact of atmospheric effects.
The results indicate that if no atmospheric effects algorithms are applied, then there is statistically significant difference in the prediction from the real yield and hence a significant error regarding the model. The study's goal is to illustrate the need of atmospheric effects removal on remotely sensed data especially for models using satellite images.