Agricultural monitoring with remote sensing

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With availability of images acquired by NASA/USGS Landsat 8 and European Copernicus Sentinel-2 remote sensing satellites, it becomes possible to provide a global coverage of Earth’s surface every 3–5 days. Such high temporal resolution is a prerequisite for developing next generation products at moderate spatial resolution (10–30 m). This is especially important for applications, involving agricultural monitoring. This study explores a combined use of Landsat 8 and Sentinel-2 data to winter wheat mapping and yield assessment at regional scale. We take advantage of the NASA’s Harmonized Landsat and Sentinel-2 (HLS) product, which provides a seamless unified product from different sensors aboard both satellites. Multiple features, such as normalized difference vegetation index (NDVI), leaf area index (LAI), difference vegetation index (DVI) and near infra-red (NIR) spectral band, are evaluated through correlation with winter wheat yield values with NDVI serving as a benchmark. We show that, when using Landsat 8 and Sentinel-2 data together, the error of winter wheat yield estimates can be reduced up to 1.8 times, compared to using a single satellite.

Keywords: agricultural monitoring, crop yield, crop mapping, Landsat 8, Sentinel-2

