Water Rennovation in Ukraine
Project no. 22320101

Visegrad Fund

Water Rennovation in Ukraine

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The project is co-financed by the Governments of the Czechia, Hungary, Poland and Slovakia through Visegrad Grants from International Visegrad Fund. The mission of the fund is to advance ideas for sustainable regional cooperation in Central Europe.

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Mapping crop health and growth under different water regimes

Péter Ragán PhD, senior lecturer

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Introduction

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- Nowadays, soil heterogeneity studies within the field are increasingly emphasized
- Satellite data is available retrospectively for a few years and is free of charge, therefore, this type of data is mostly used by consultants in precision agriculture.
- They are many vegetation indices, they were collected on this website they were collected on this website https://www.indexdatabase.de/db/i.php.
- The most commonly used from the vegetation indices is Normalized Difference Vegetation Index, the formula is NDVI = (NIR – Red)/(NIR + Red).

Software and Data acquisition

- Open source Quantum GIS software (supports Windows, macOS, Linux, BSD) https://qgis.org/en/site/
- Earth Explorer Browser (for viewing data) https://apps.sentinel-hub.com/eo-browser/
- New Sentinel 2 data (after free registration) https://browser.dataspace.copernicus.eu
- Historical Sentinel 2 data (after free registration) https://catalogue.onda-dias.eu/catalogue/

Sentinel 2 data format

Bands	wavelength (µm)	Spatial resolution (m)
Band 1 - Coastal aerosol	0.443	60
Band 2 - Blue	0.490	10
Band 3 - Green	0.560	10
Band 4 - Red	0.665	10
Band 5 - Vegetation Red Edge	0.705	20
Band 6 - Vegetation Red Edge	0.740	20
Band 7 - Vegetation Red Edge	0.783	20
Band 8 - NIR	0.842	10
Band 8A - Vegetation Red Edge	0.865	20
Band 9 - Water vapour	0.945	60
Band 10 - SWIR - Cirrus	1.375	60
Band 11 - SWIR	1.610	20
Band 12 - SWIR	2.190	20

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Data integration of various data formats

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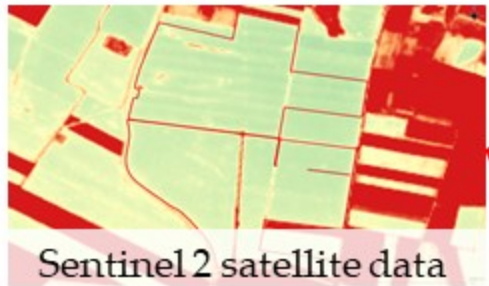
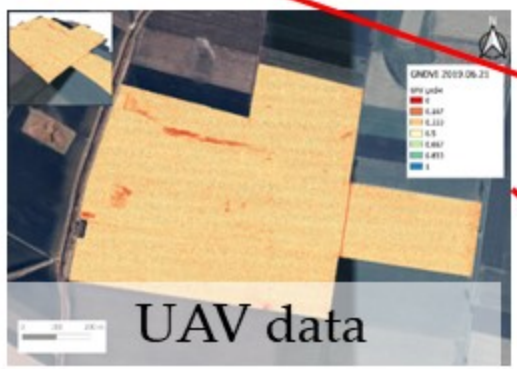
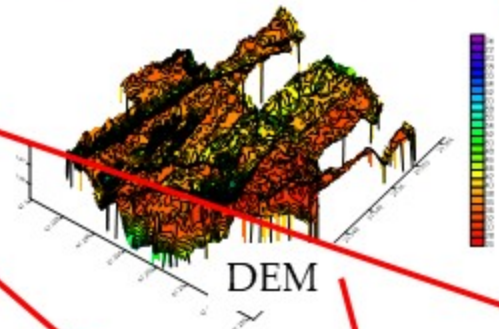


Hand measured data

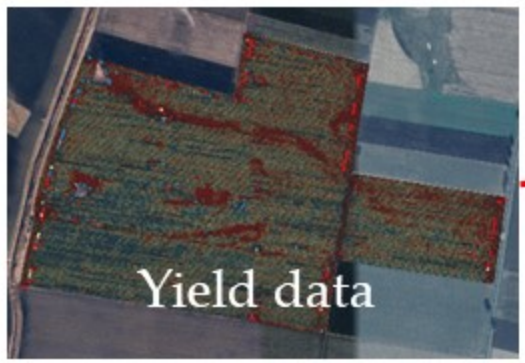
Results of linear and multilinear regressions based on RStudio

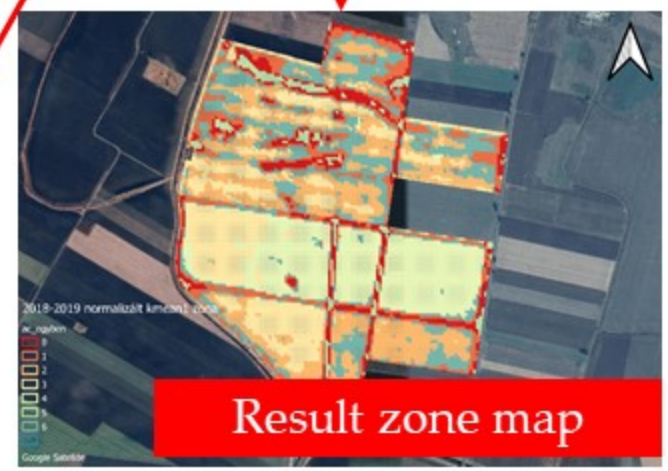
Numerical database





Cluster based zone mapping





Graphical abstract

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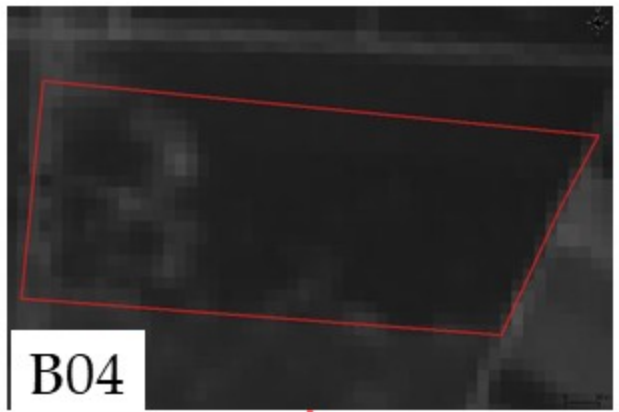
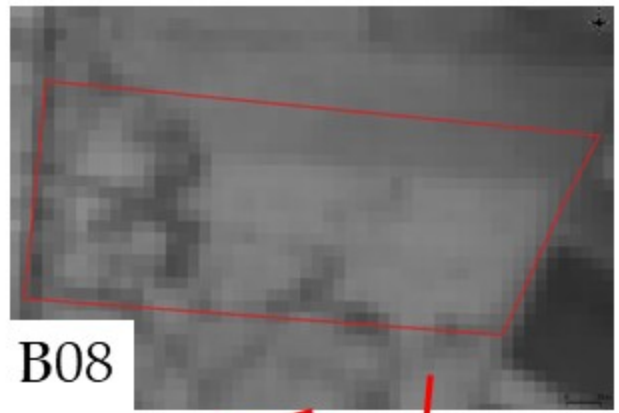
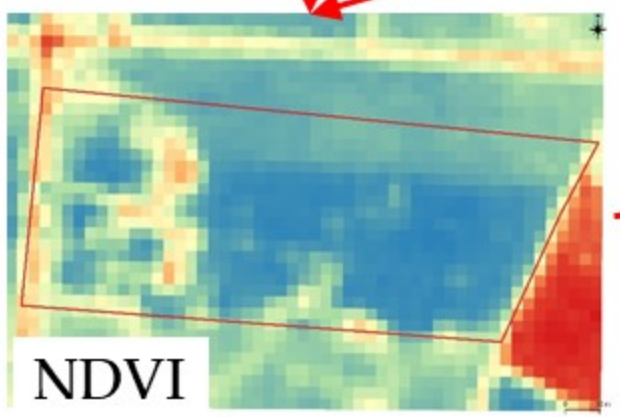
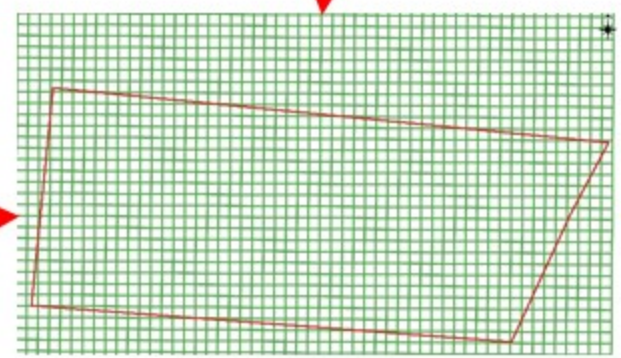


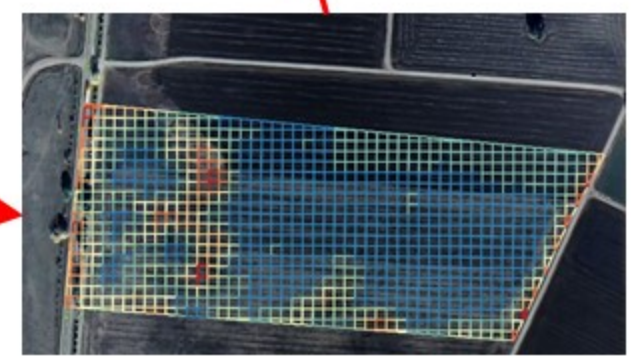


Zone map





10x10m UTM vector grid



GIS database

Steps I/III.

1. Install Quantum GIS from qgis.org
2. production of field contour, if there is none, even with the help of Google Earth
3. Install qgis_basemaps.py basemap (optional)
4. Attribute based clustering module installation (requires internet)
5. download a satellite image corresponding to the vegetation from the website
6. Cropping the satellite image to the part around the board

Steps II/III.

7. Creating a UTM vector grid from this clipped raster or from the TCI channel
8. Cutting the UTM vector grid with the table contour
9. Saving the cut grid into a geospatial database
10. Loading the corresponding channels of the satellite image (in the case of NDVI, B04 and B08)
11. Vegetation index calculation with a raster calculator
12. Transcription of vegetation data into the vector with zone statistics

Steps III/III.

13. OPTIONAL integration of data from other sources - raster-based (UAV) or vector-based (ground scanner yield)
14. clustering using the previously installed attribute based clustering module
15. Creating a print layout
16. Save print layout as image

Thank you for your attention!

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