



OVERVIEW OF THE REMOTE SENSING TOOLS TO IDENTIFY CHANGES IN PLANTS AND APPLICATION FOR PLANTS HEALTH

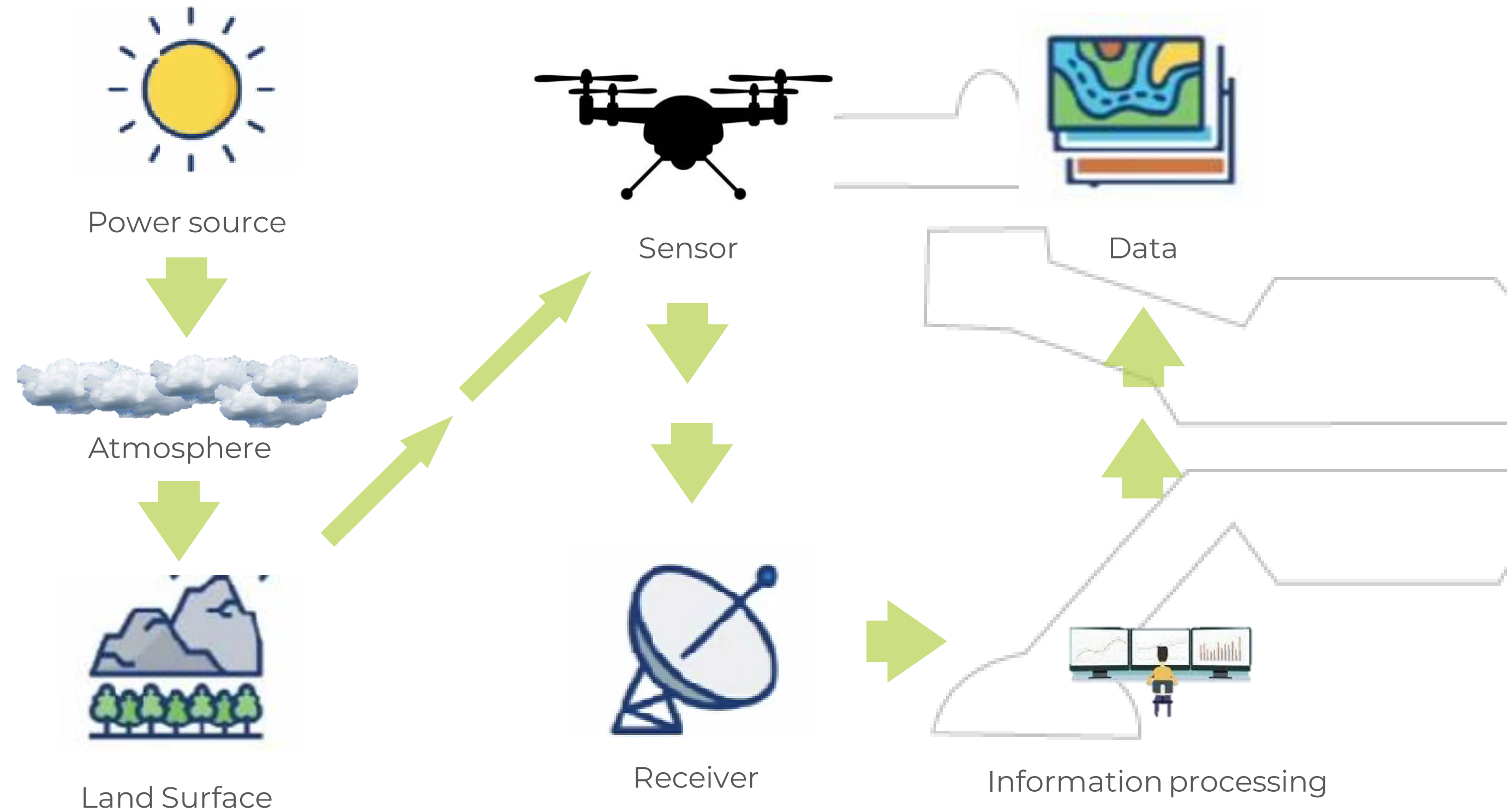




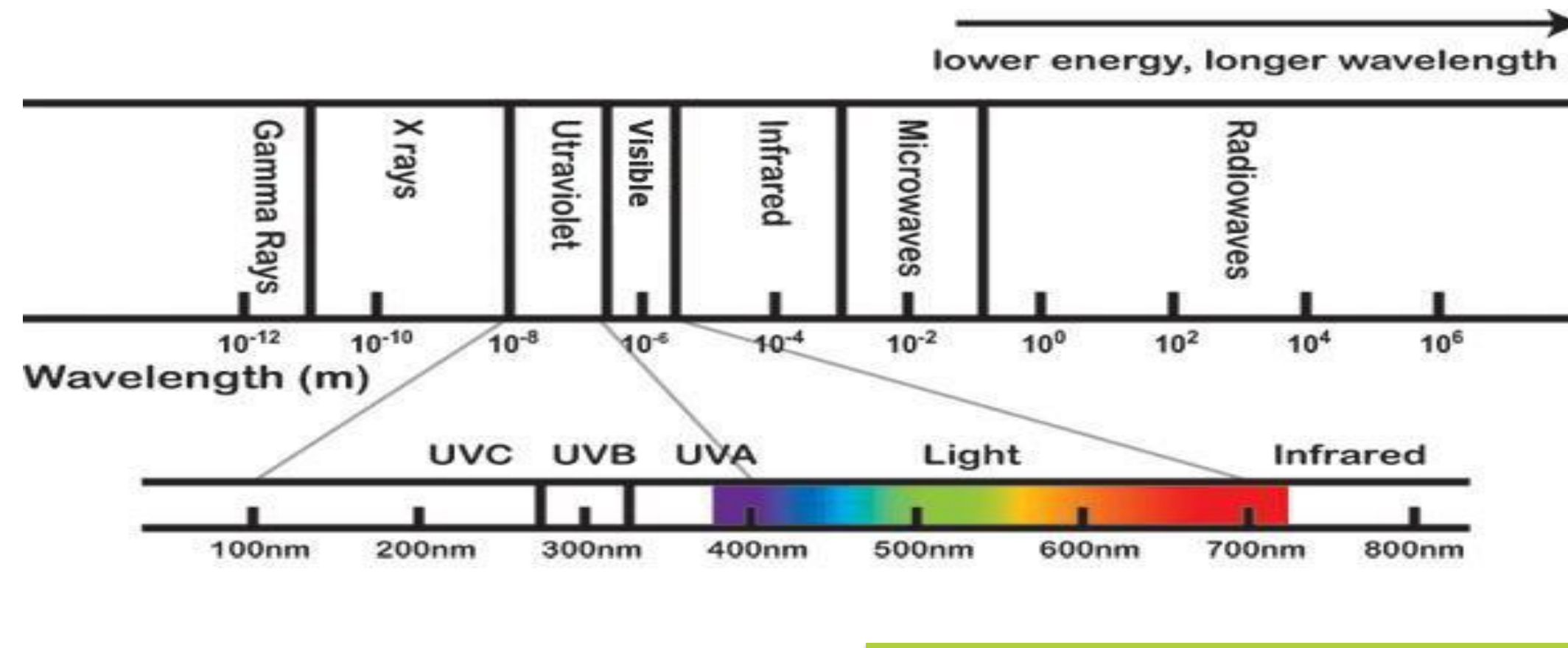
What is remote sensing?

Remote sensing is a tool that allows information to be acquired from an object or surface by using a sensor that is not in contact with the objects.

Remote sensing process



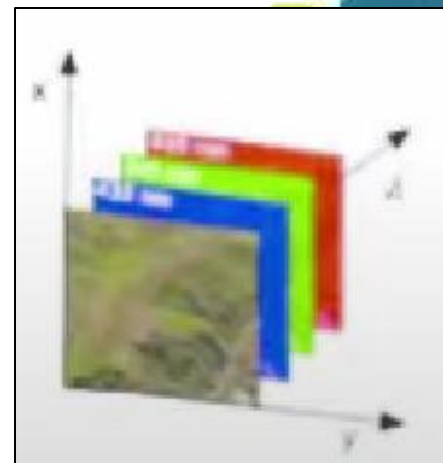
Electromagnetic Spectrum



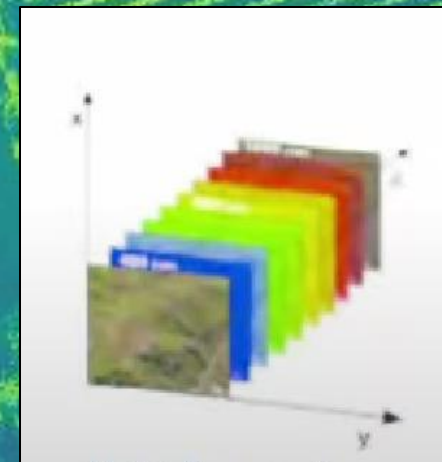
Sensors detect non-visible regions of the electromagnetic spectrum

What sensors are used in remote sensing?

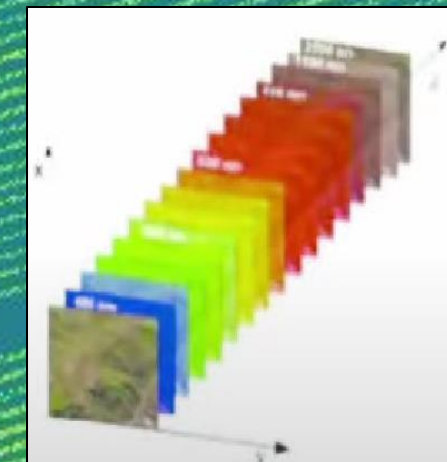
- The sensors allow capturing a set of images used to elaborate reflectance maps
- Maps are analyzed through vegetation index



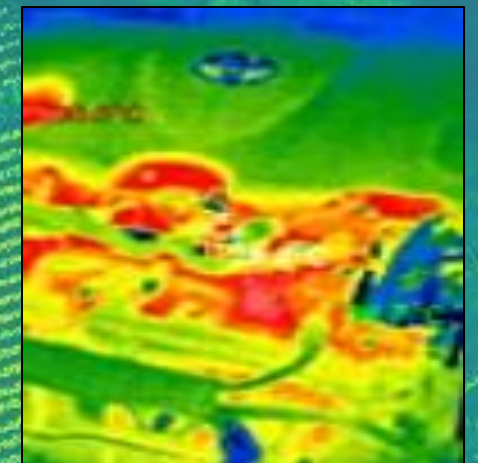
RGB



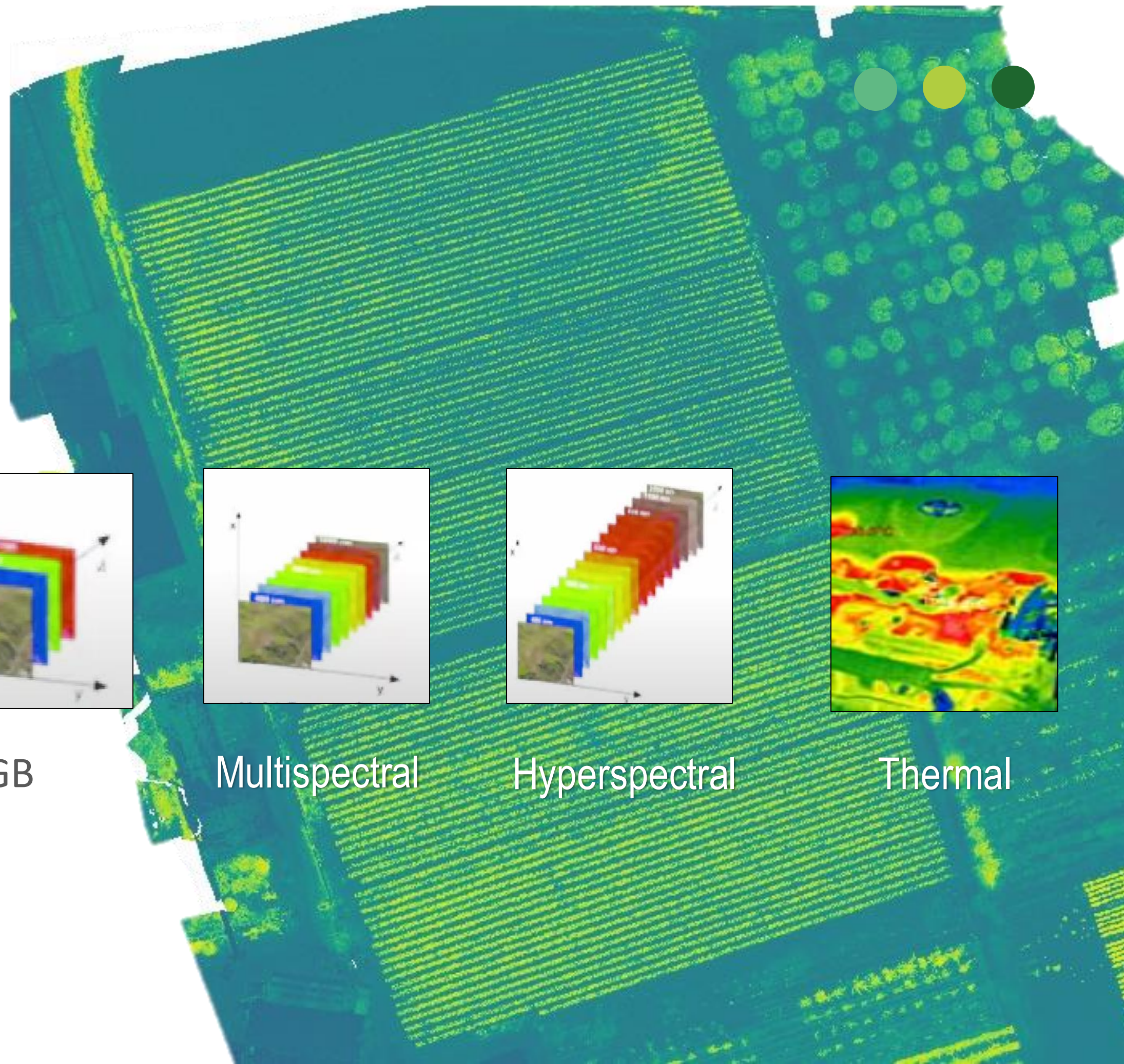
Multispectral



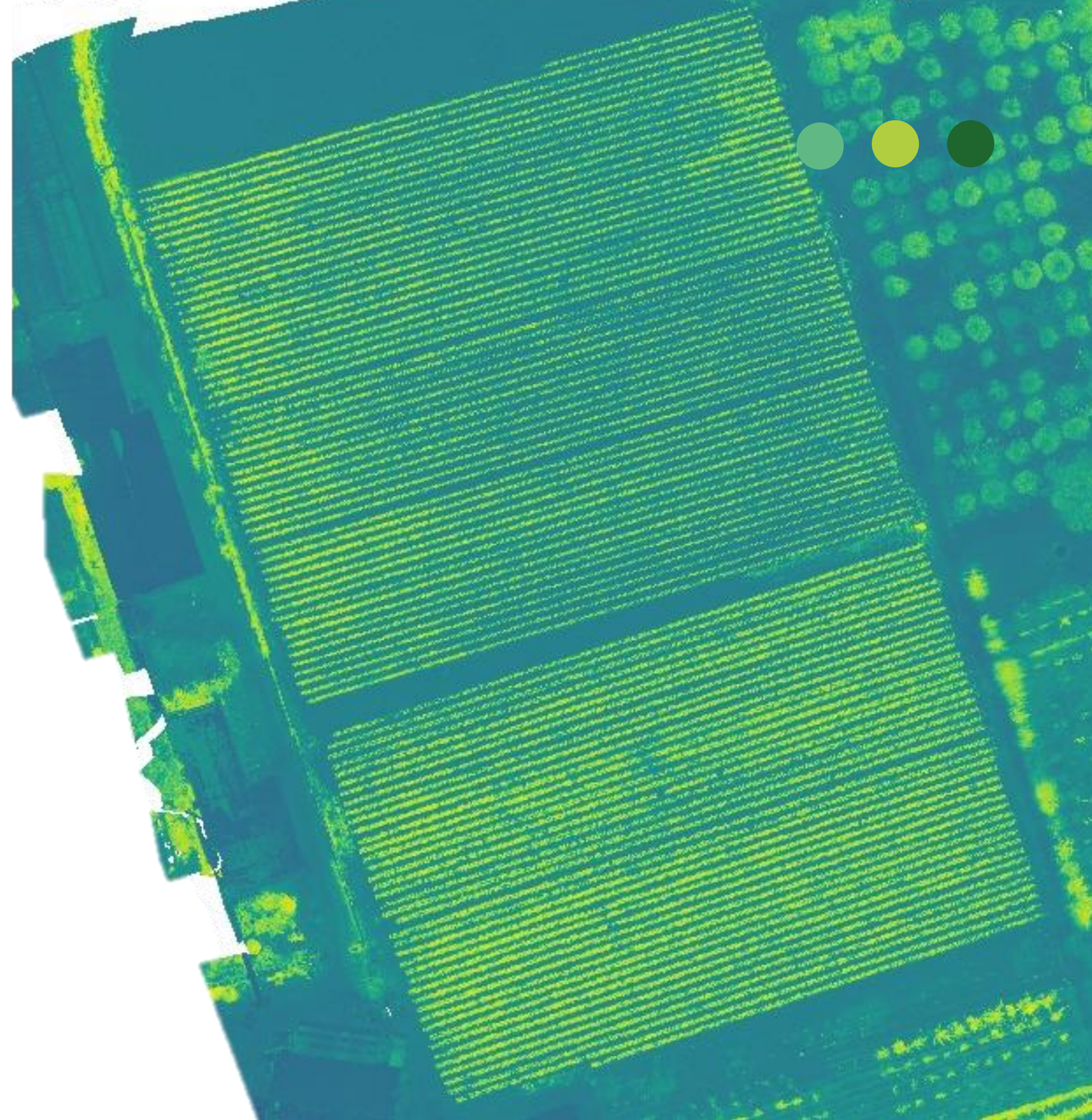
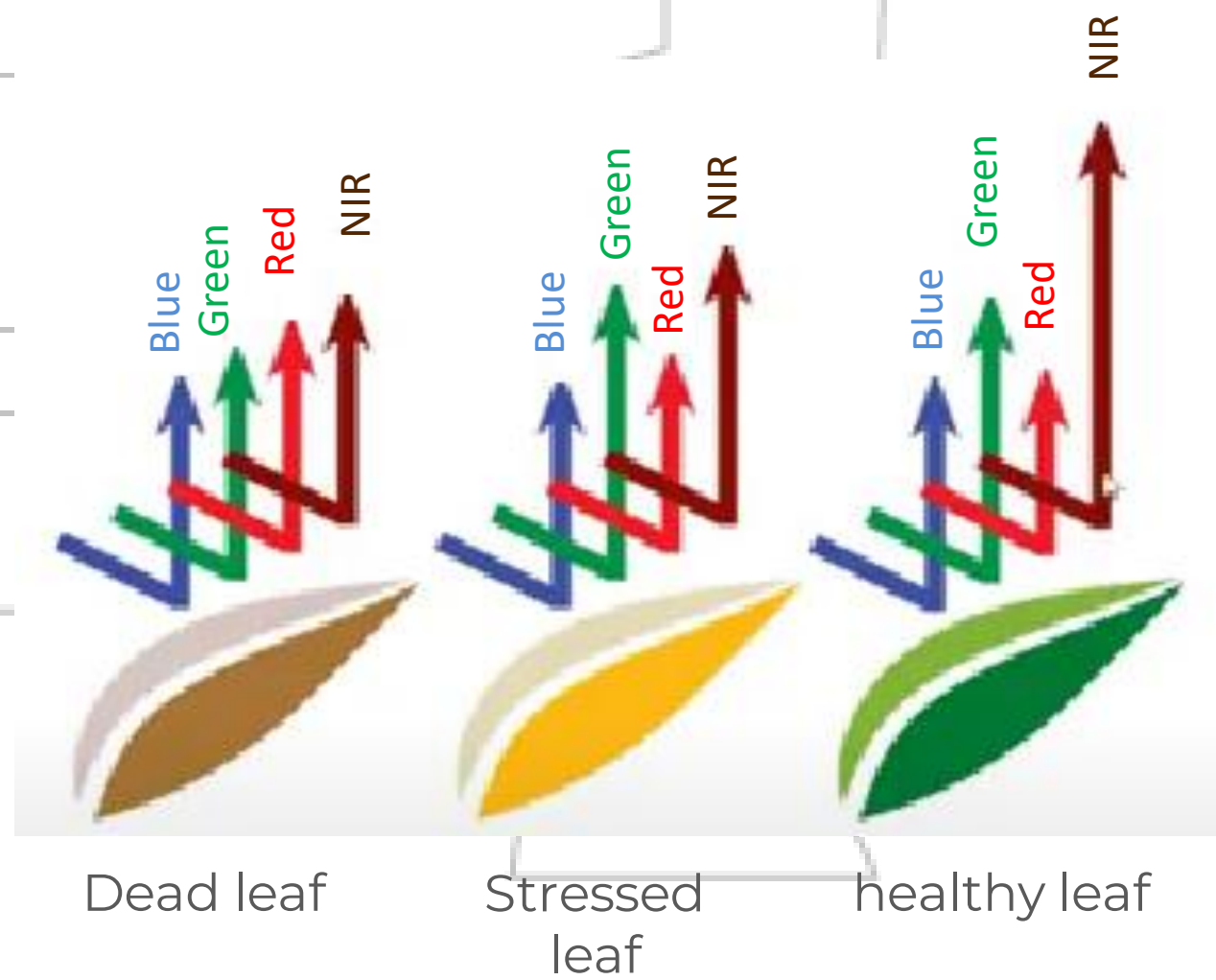
Hyperspectral



Thermal



What does it measure?



Vegetation indices

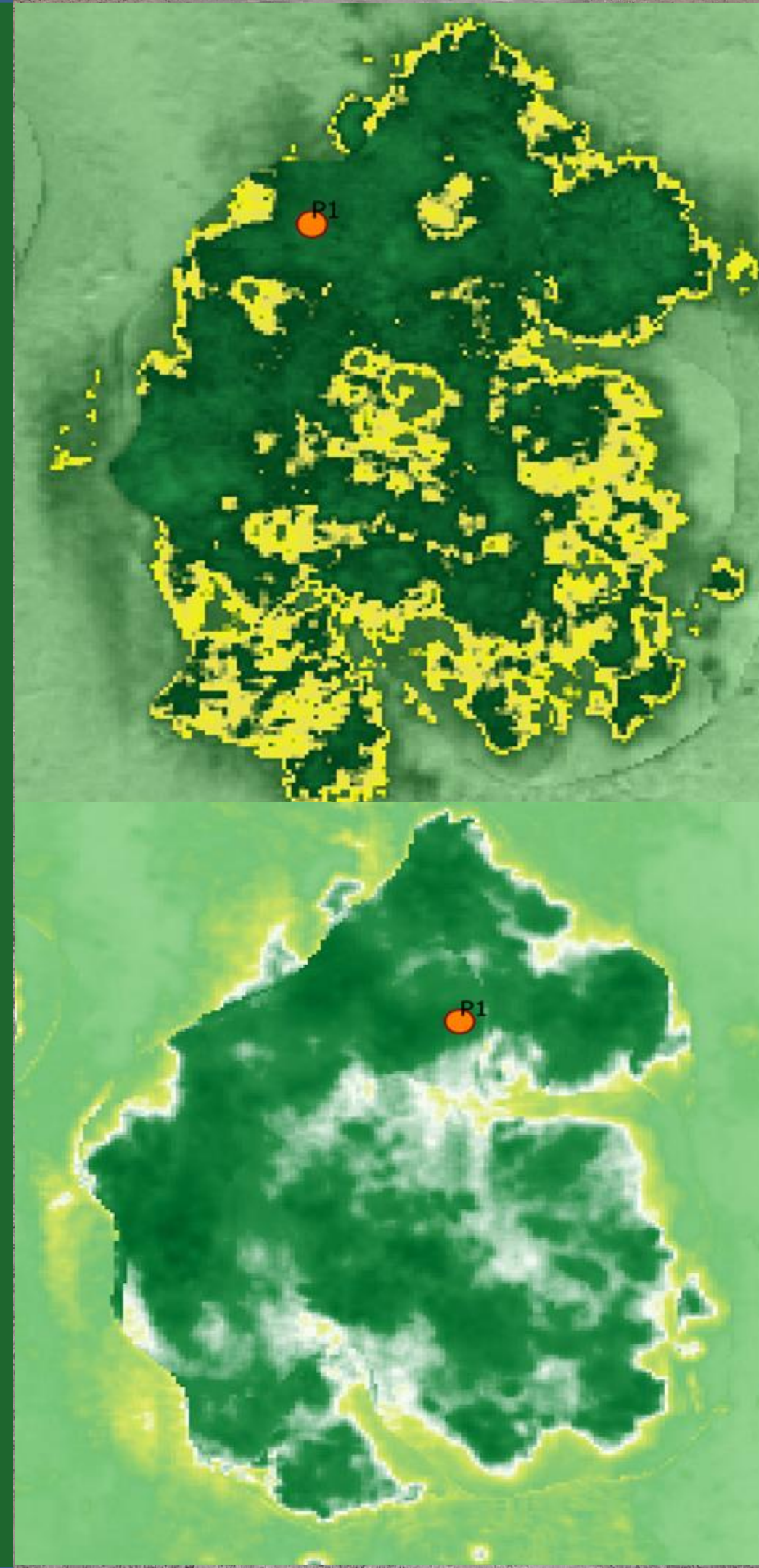
Indices are quantitative measurements calculated using formulas that consider two or more spectral bands that are added, divided, or multiplied.

NDVI

Normalized Difference
Vegetation Index

$$\text{NDVI} = (\text{NIR} - \text{Red}) / (\text{NIR} + \text{Red})$$

- Range from -1 to 1
- Negative values: water surfaces, artificial structures, rocks, clouds and snow
- 0.1 to 0.2: ground
- 0.2 to 1: vegetation





Applications in agriculture



Identify changes in
plants.



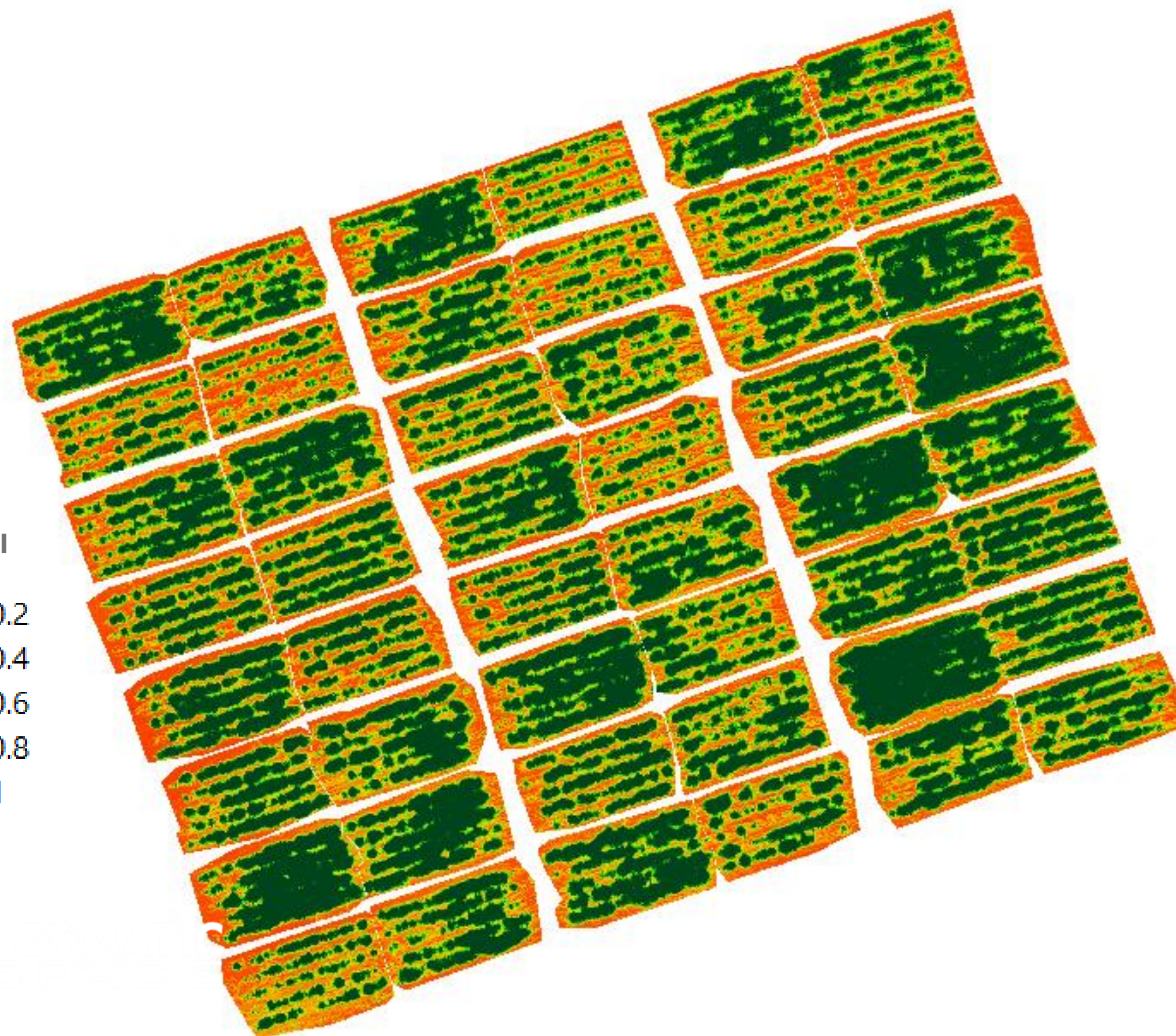
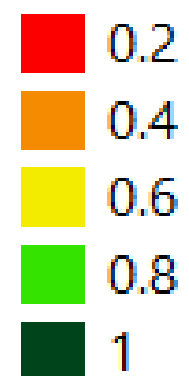
Crop area
estimation



Weed identification



NDVI



Phaseolus vulgaris -
bean crop

Crop vigor

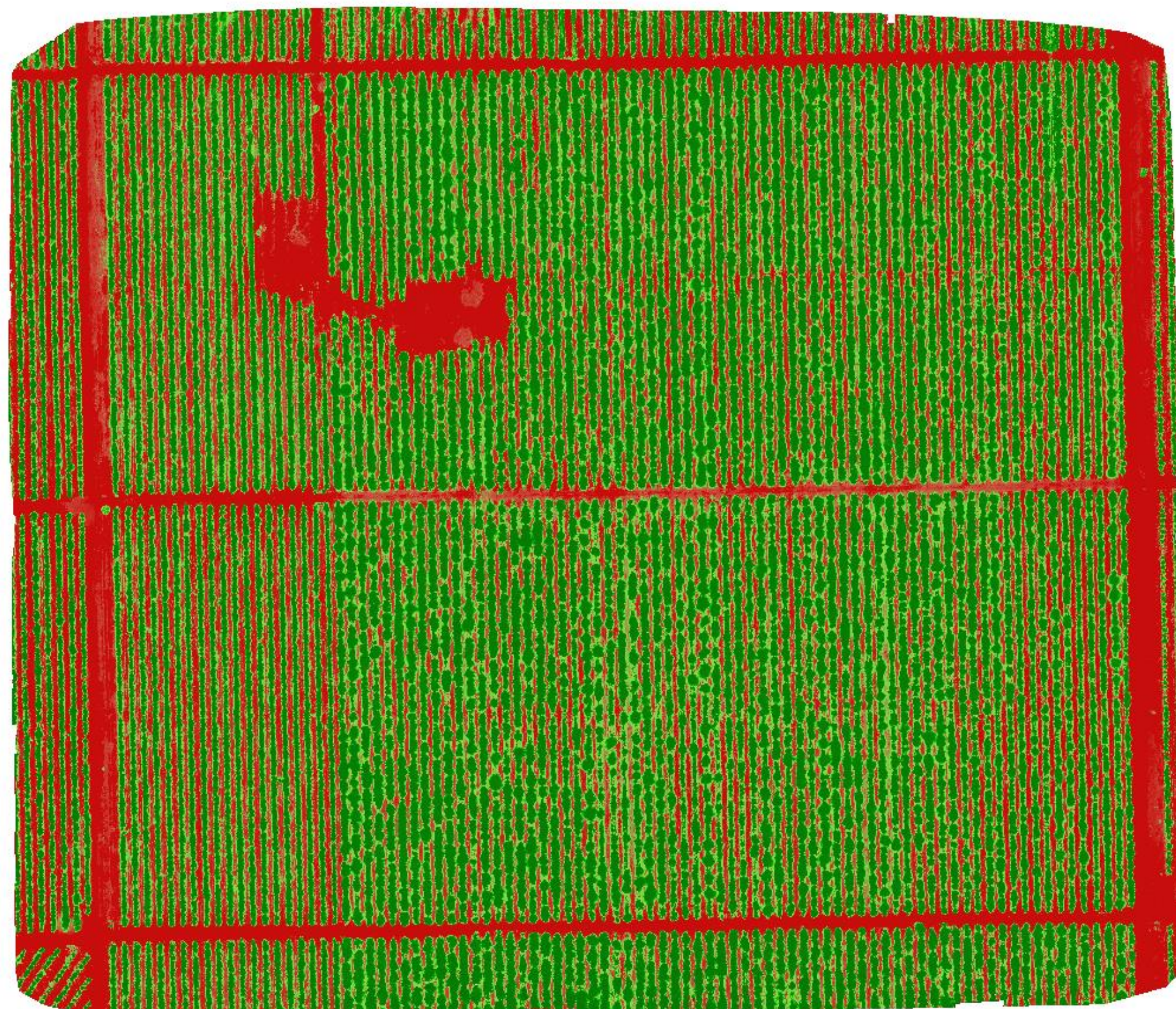




NDVI

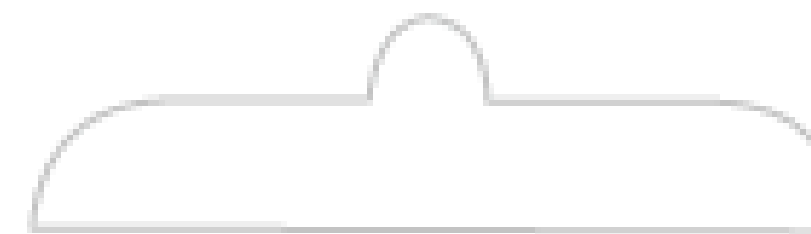
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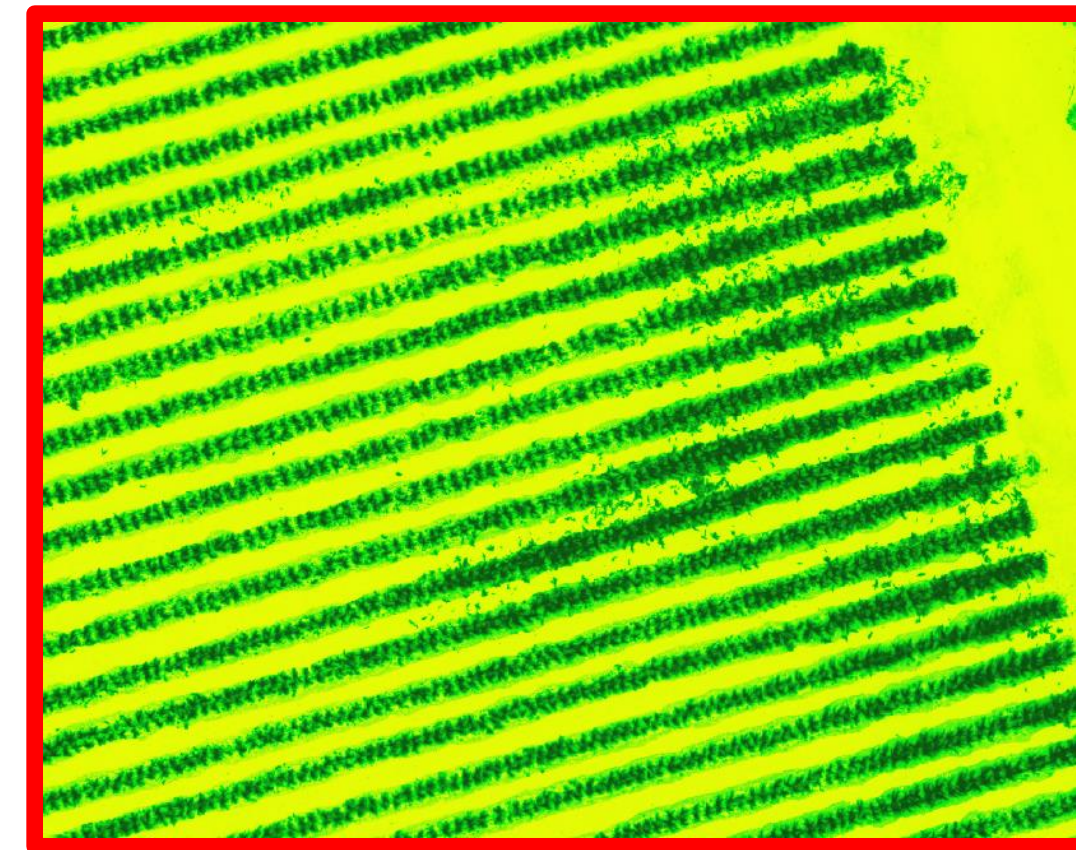
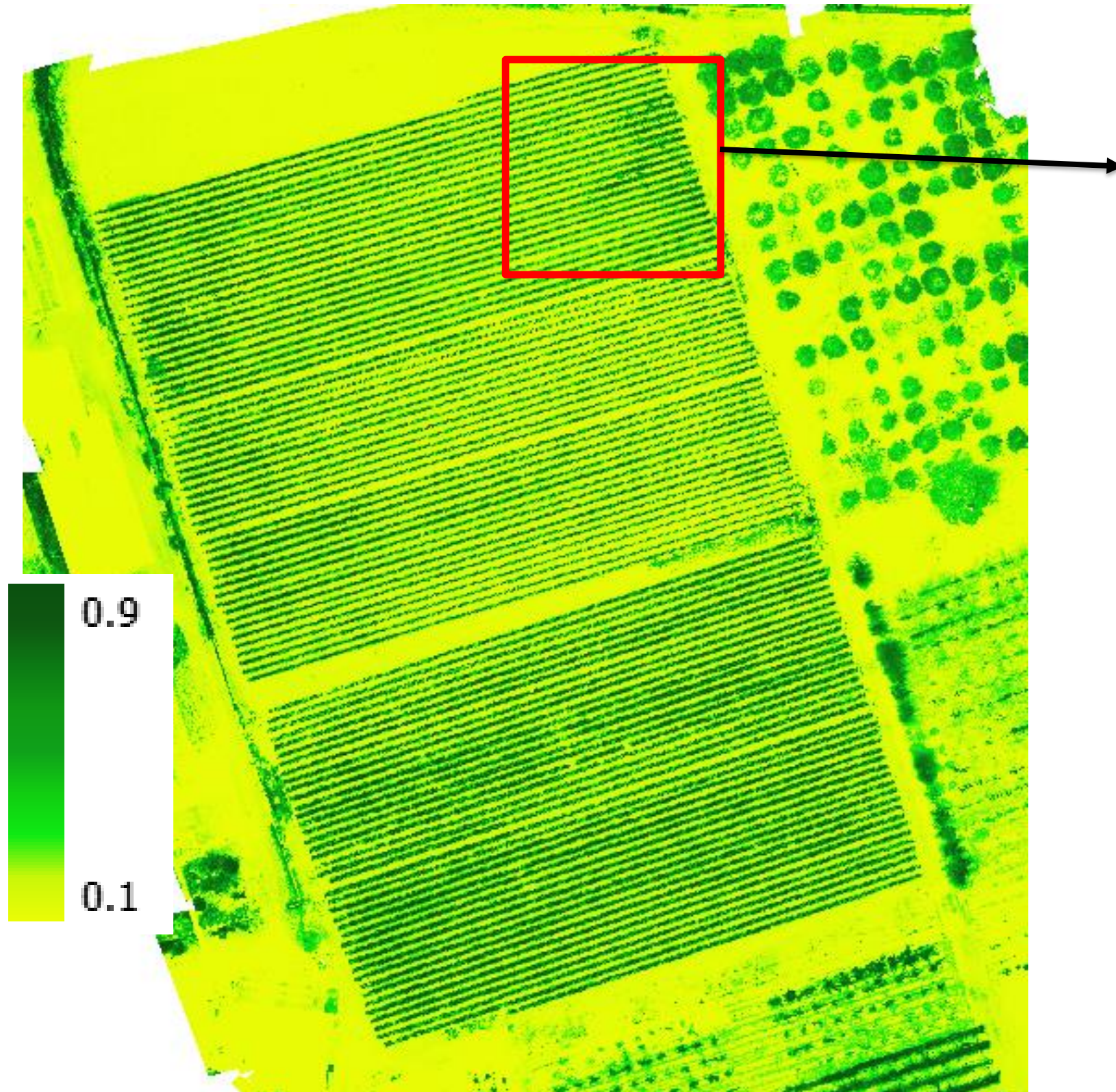
0.1



Persea Americana –
avocado crop

Identification of *Lasiodiplodia*
theobromae





Zea mays - **Corn crop**

Presence of weeds


Efficient use of resources

THANK YOU


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