



Vegetation Indices

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What's next

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What is a Vegetation Index

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Vegetation Index calculation



What is a Vegetation Index?

Some mathematical combination or transformation of spectral bands that accentuates the spectral properties of green plants so that they appear distinct from other image features.

A good vegetation index should



Indicate the amount of vegetation

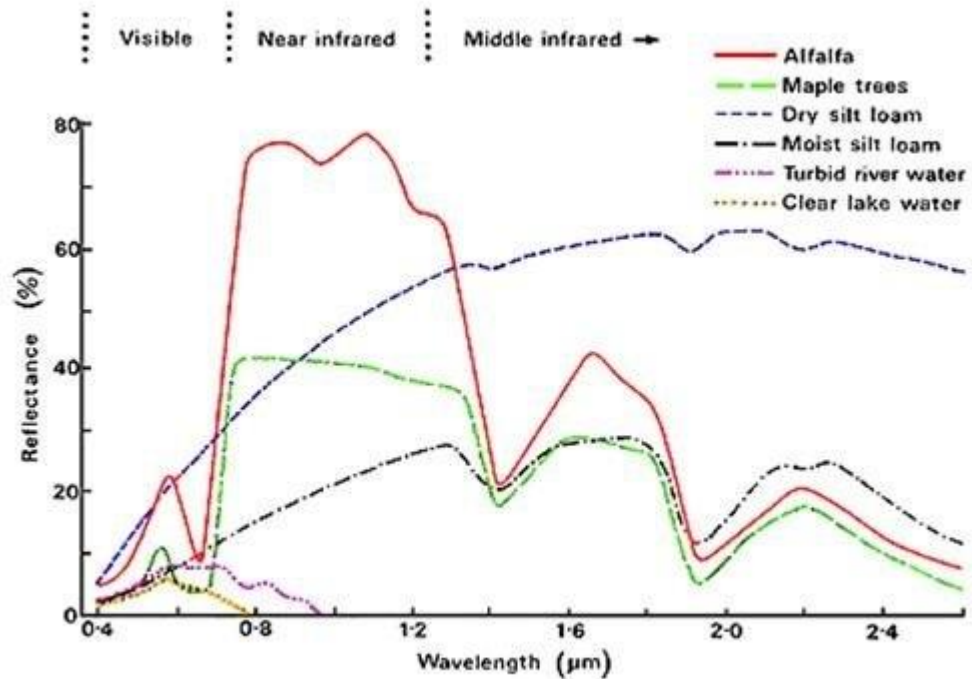


Distinguish between soil and vegetation



Reduce atmospheric and topographic effects if possible

Soil Reflectance



DIFFERENCE between NIR reflectance and Red reflectance for soil is much less than for live vegetation



Difference Vegetation Index (DVI)

$$\text{DVI} = \text{NIR} - \text{Red}$$

- Probably the simplest vegetation index.
- Sensitive to the amount of vegetation Distinguishes between soil and vegetation.
- Does NOT deal with the difference between reflectance and radiance caused by the atmosphere or shadows.



Ratio-based Vegetation Indices (RVI)

$$SR = NIR/Red$$

- Simplest ratio-based index is called the Simple Ratio (SR) or Ratio Vegetation Index (RVI).
- High for vegetation
- Low for soil, ice, water, etc.
- Indicates amount of vegetation
- Reduces the effects of atmosphere and topography

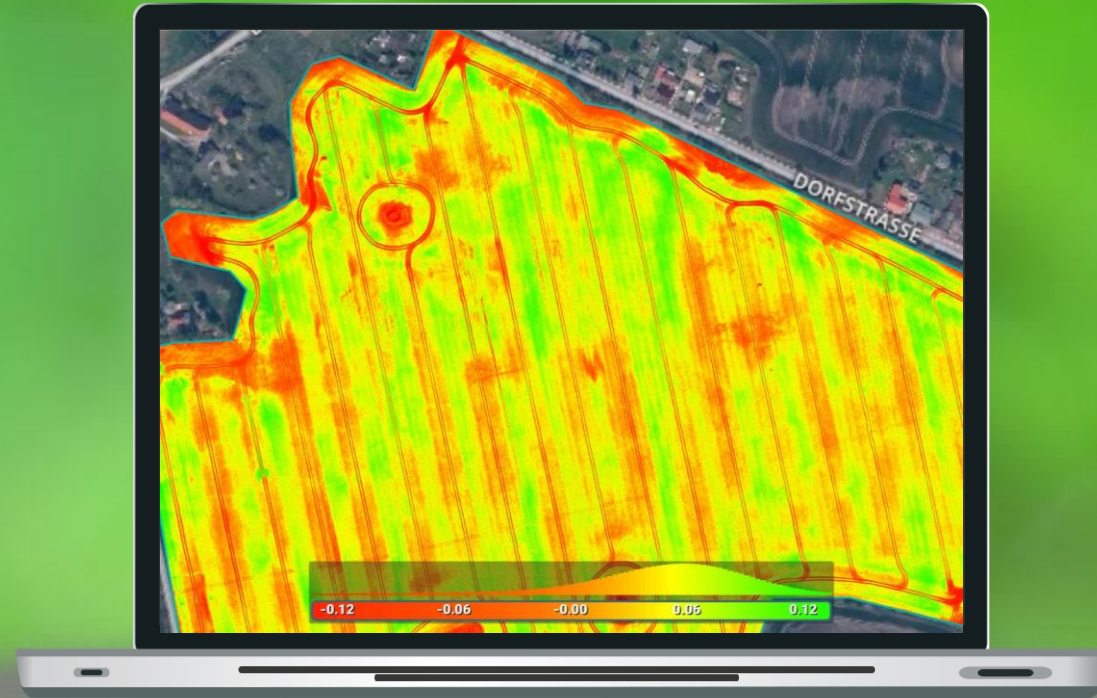


Normalized Difference Vegetation Index (NDVI)

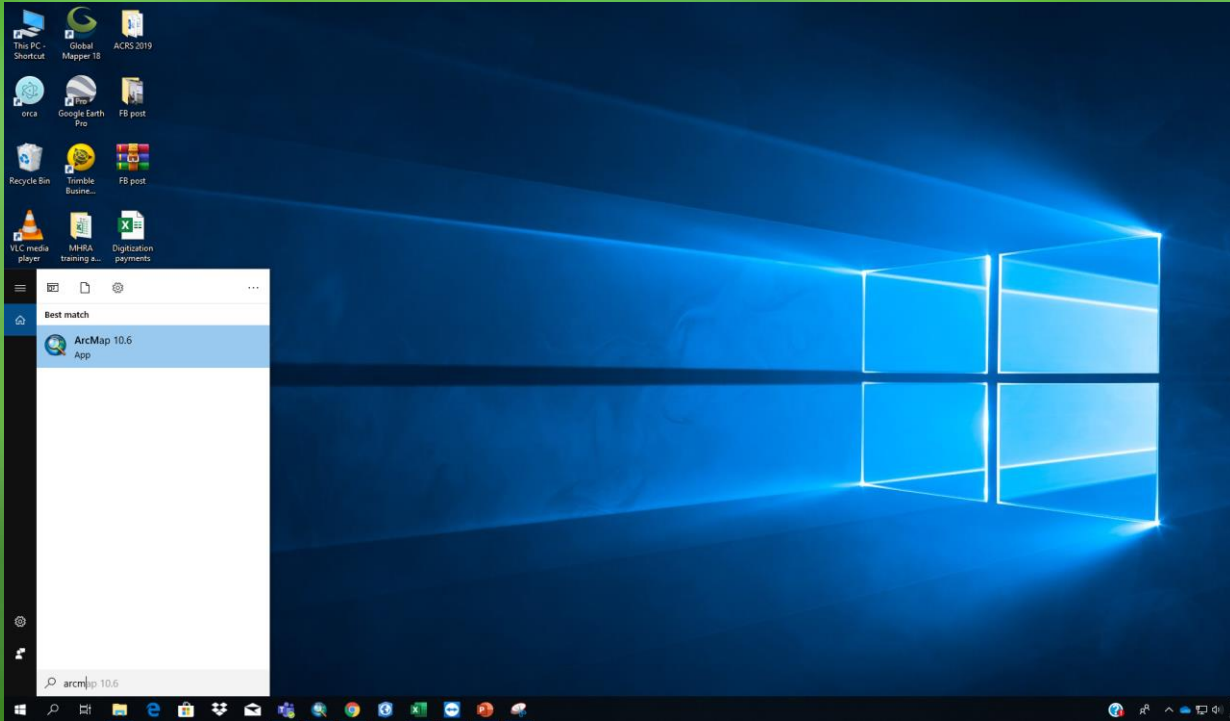
$$\text{NDVI} = \frac{(\text{NIR} - \text{Red})}{(\text{NIR} + \text{Red})}$$

- Ranges from -1 to 1 High for vegetation
- Indicates amount of vegetation, distinguishes veg from soil, minimizes topographic effects
- A good index

Calculating Vegetation Indices in ArcMap

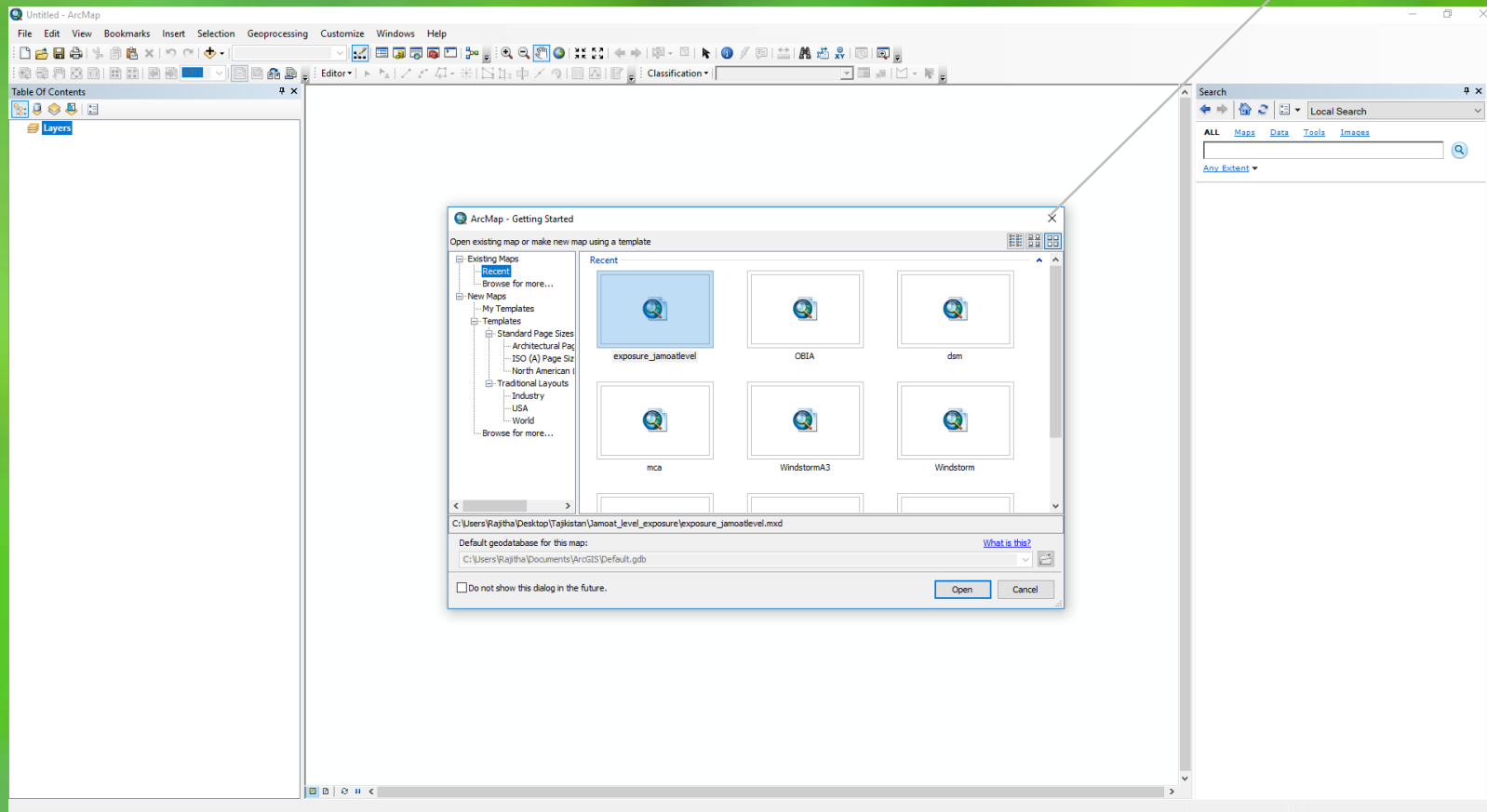


Open ArcMap in your computers

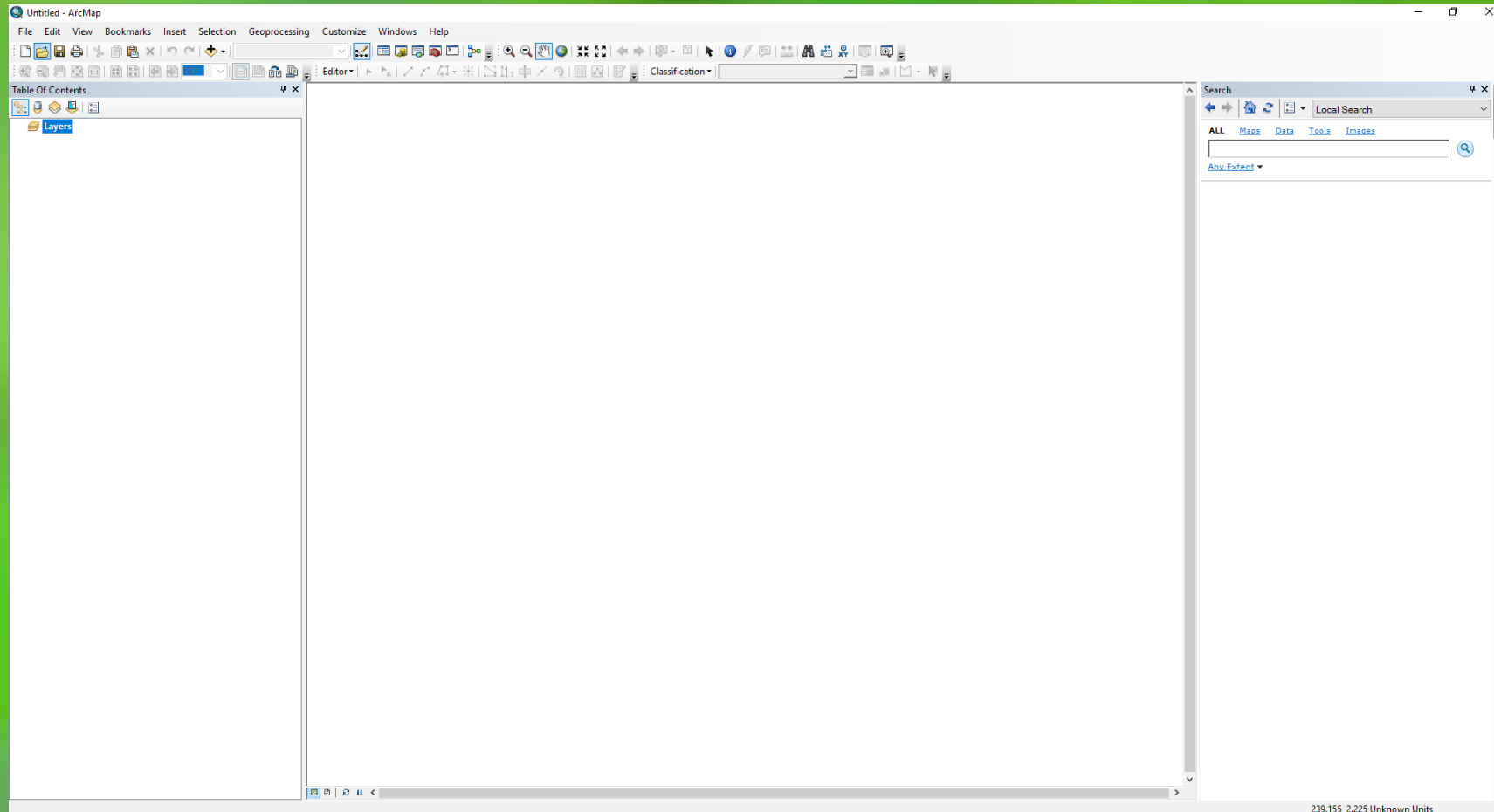


Open ArcMap in your computers

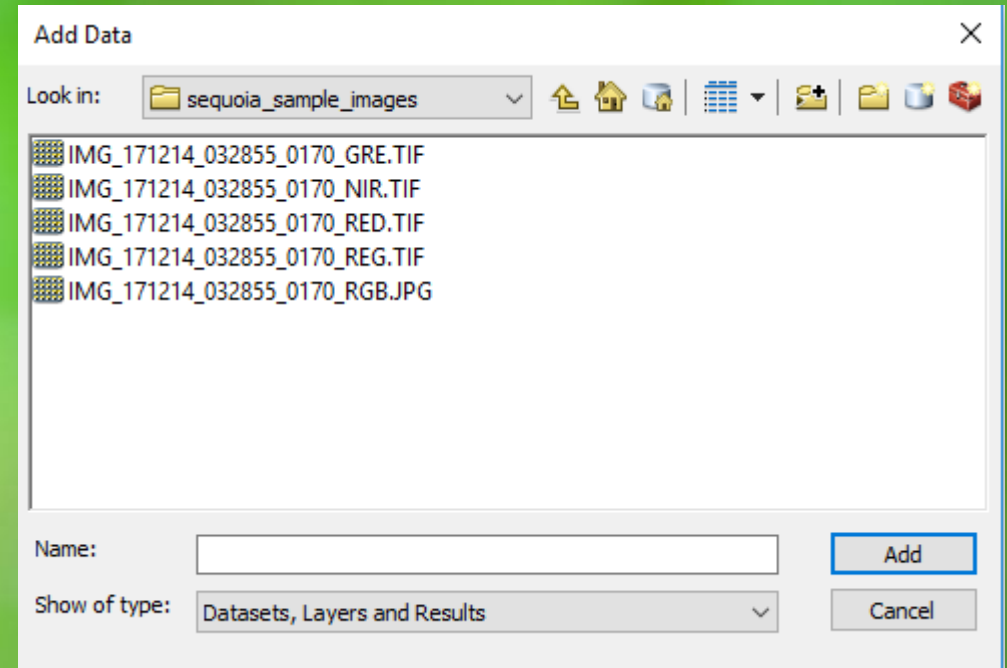
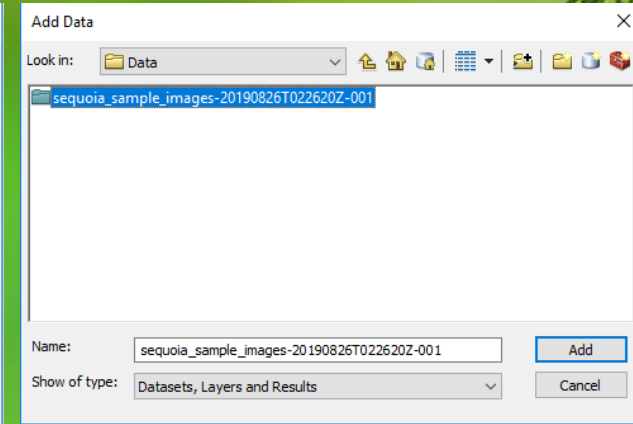
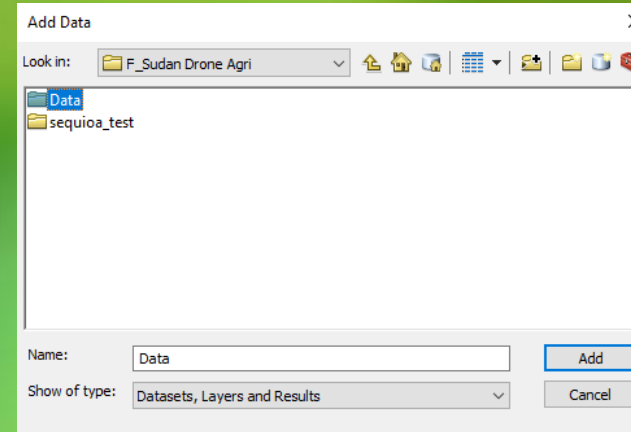
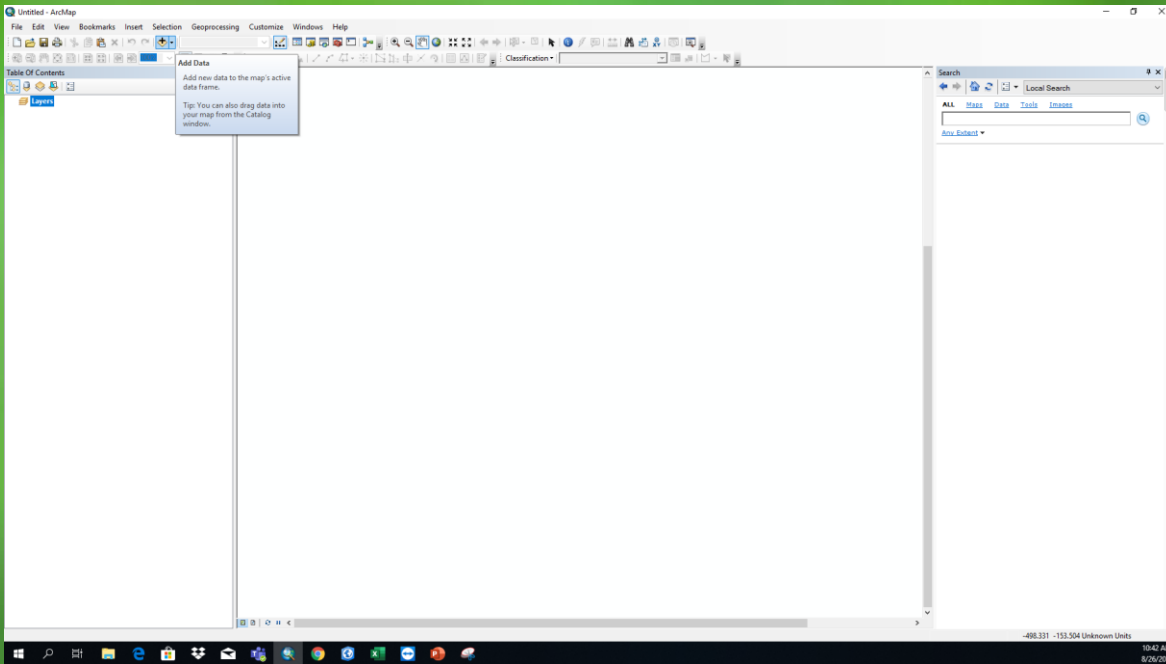
Click the close button



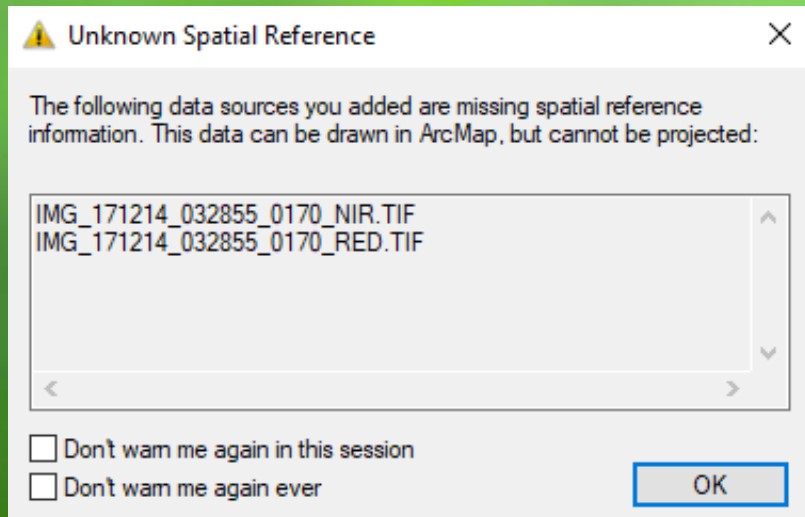
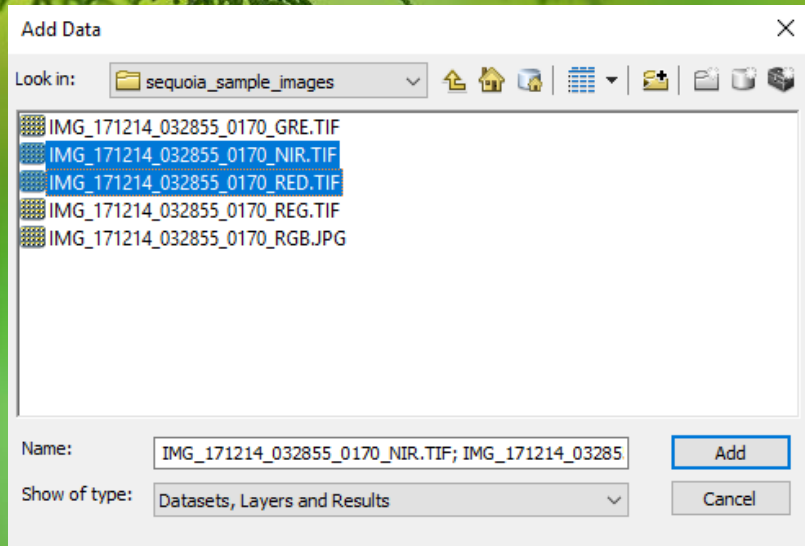
Basic interface of ArcMap will appear



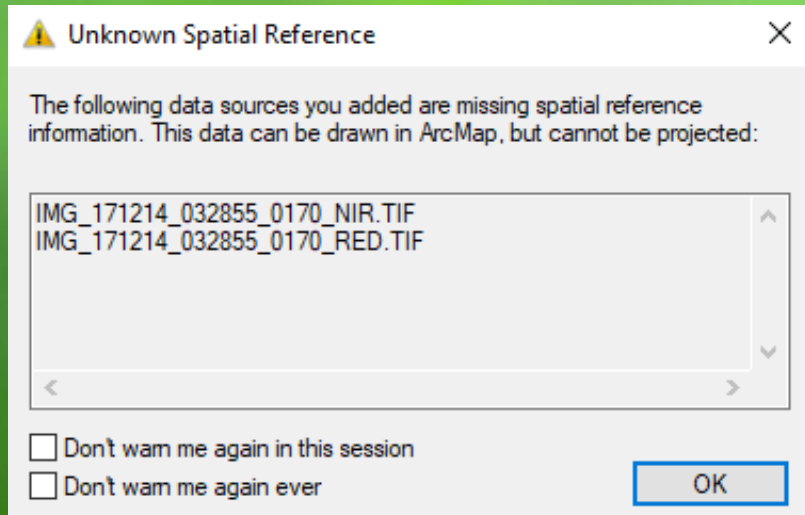
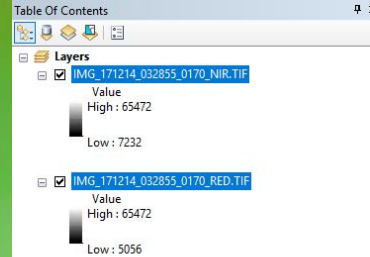
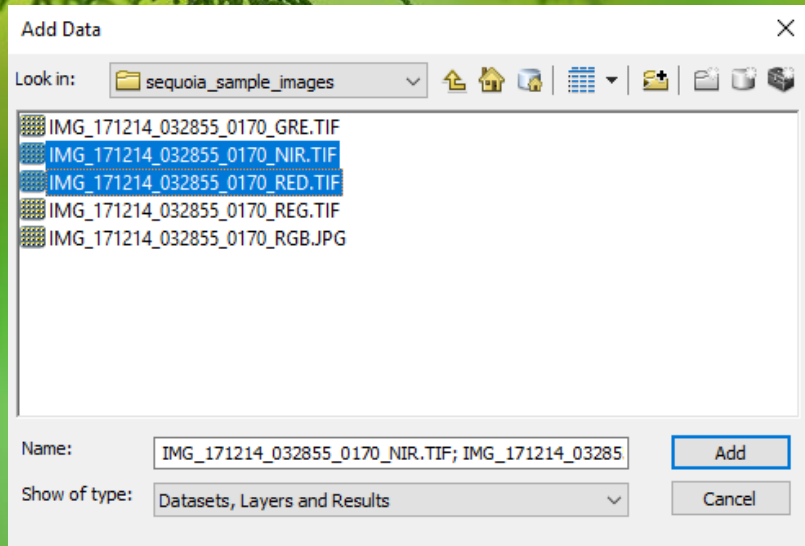
Add SEQUOIA sensor data



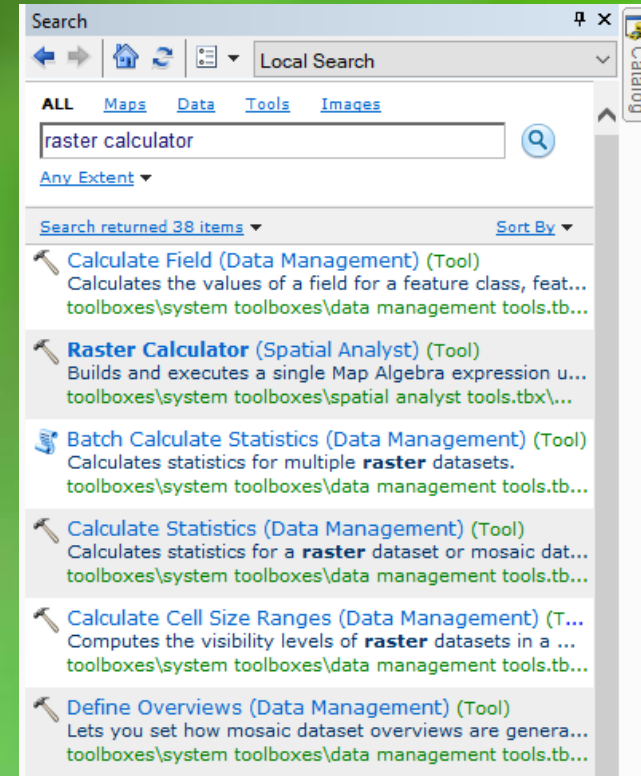
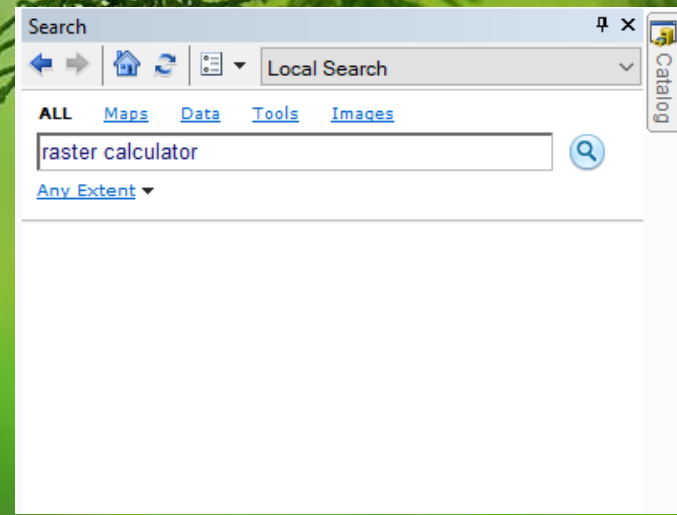
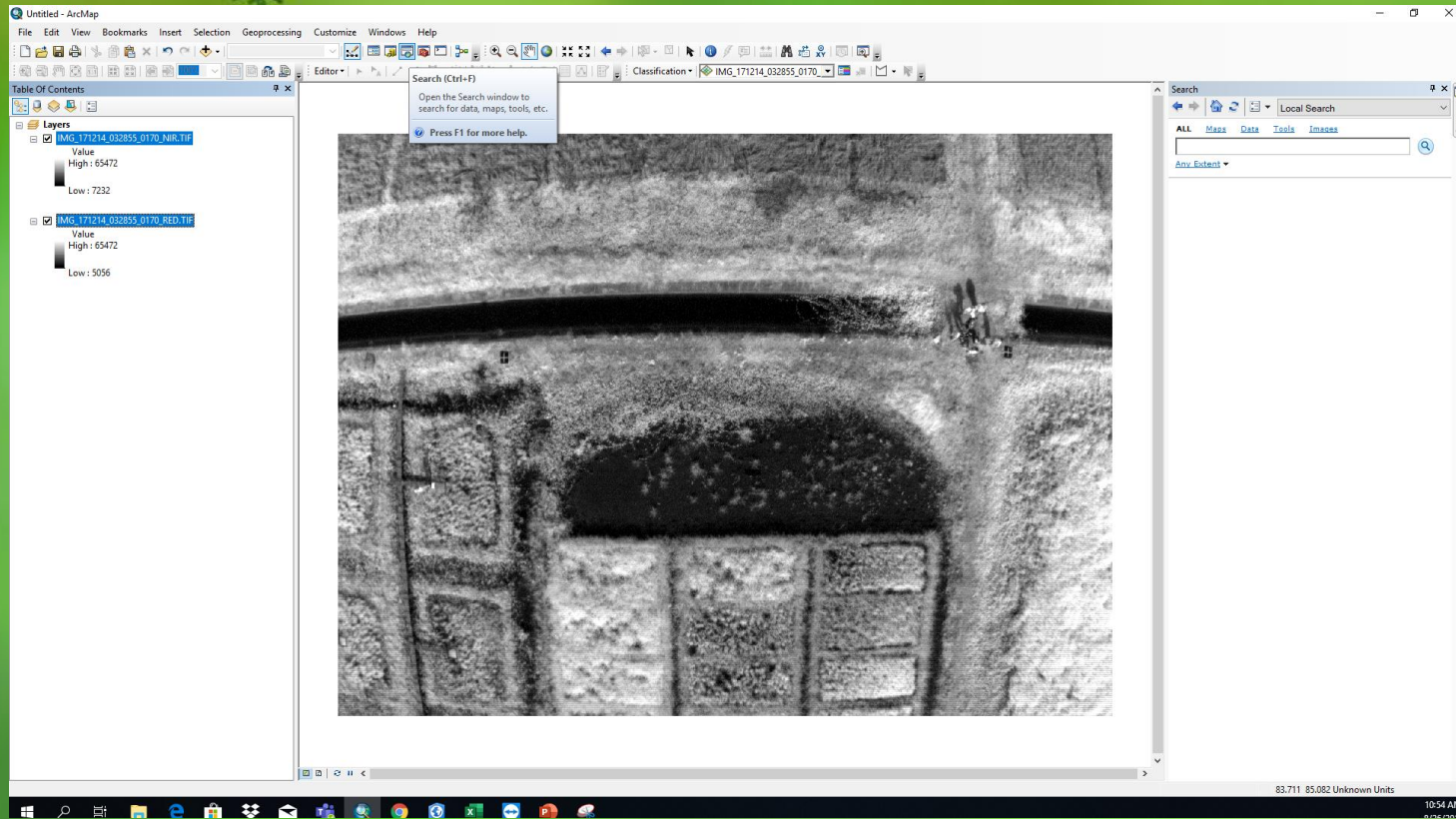
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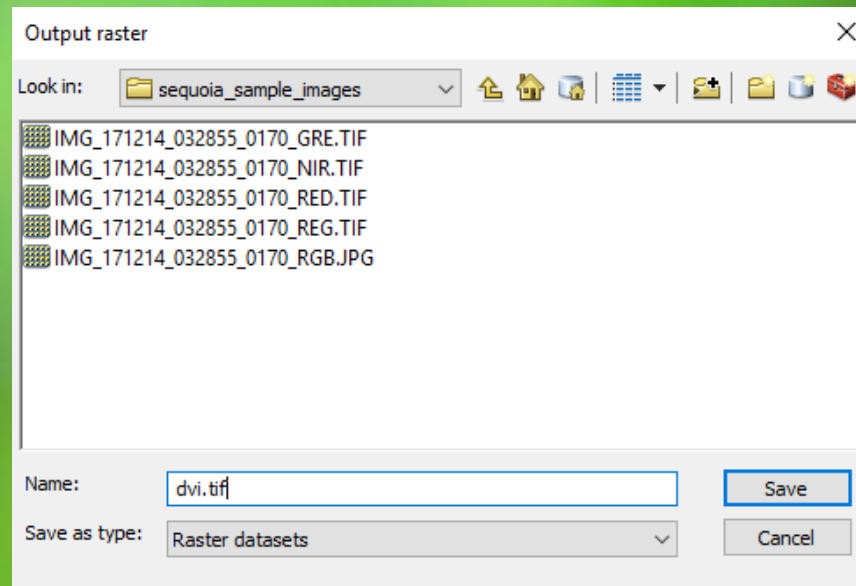
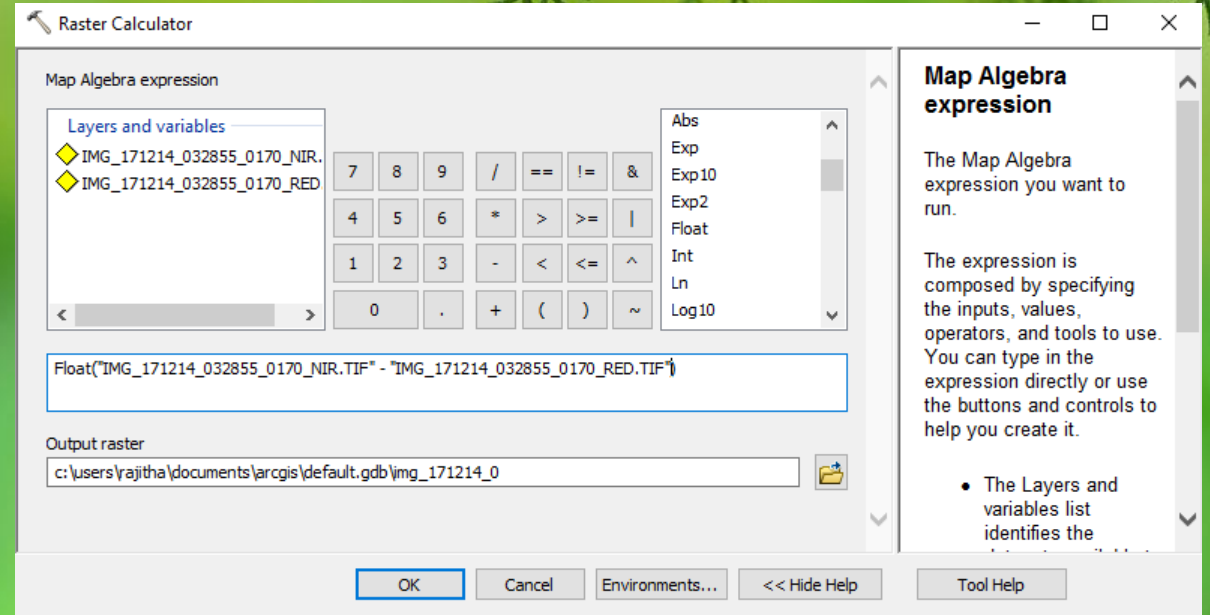
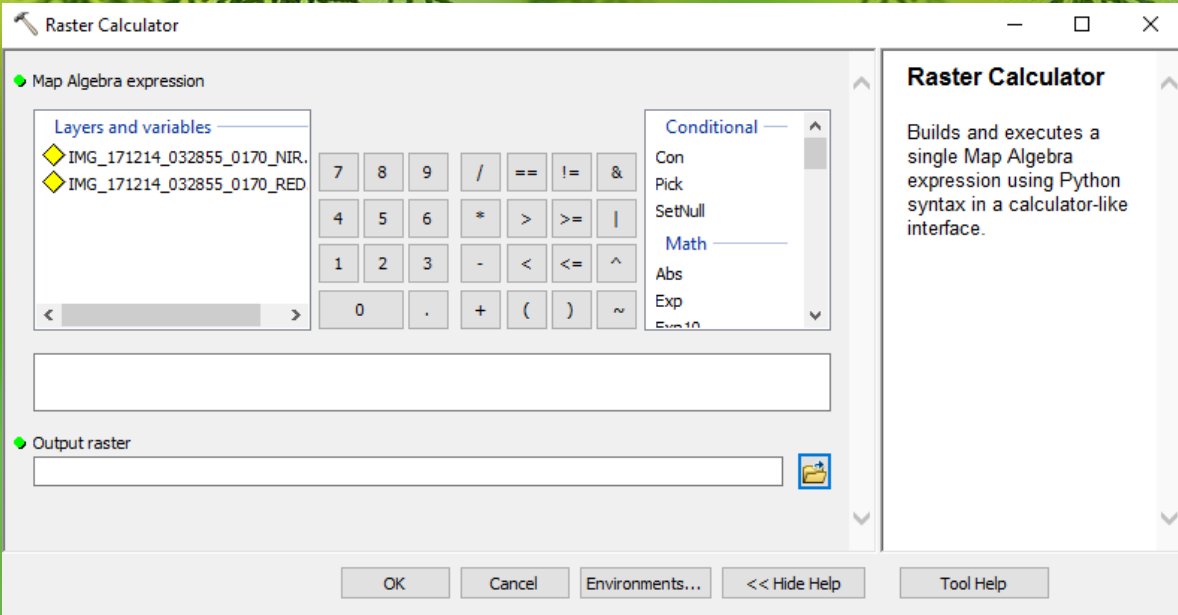
Add SEQUOIA sensor data



Raster calculator



Raster calculator for DVI



Raster calculator for DVI

Table Of Contents

Layers

- dvi.tif**
Value
High : 55808
Low : -52160
- IMG_171214_032855_0170_NIR.TIF**
Value
High : 65472
Low : 7232
- IMG_171214_032855_0170_RED.TIF**
Value
High : 65472
Low : 5056

Untitled - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing

Table Of Contents

Layers

- dvi.tif**
 - Copy
 - Remove
 - Open Attribute Table
 - Joins and Relates
 - Zoom To Layer
 - Zoom To Make Visible
 - Zoom To Raster Resolution
 - Visible Scale Range
 - Data
 - Edit Features
 - Save As Layer File...
 - Create Layer Package...
 - Properties...**

Layer Properties
Display the properties of this layer

Layer Properties

General Source Key Metadata Extent Display Symbology Time

Show:
Vector Field
Unique Values
Classified
Stretched
Discrete Color

Stretch values along a color ramp

Color: [Grayscale Ramp]

Value	Label
55808	High : 55808
-52160	Low : -52160

Color Ramp: [Grayscale]

Display Background Value: 0 as []

Use hillshade effect Z: 1 Display NoData as []

Stretch Type: Percent Clip [] Histograms []

min: 0.5 max: 0.5 Invert

Apply Gamma Stretch: 1

OK Cancel Apply

Layer Properties

General Source Key Metadata Extent Display Symbology Time

Show:
Vector Field
Unique Values
Classified
Stretched
Discrete Color

Stretch values along a color ramp

Color: [Red-to-Green Ramp]

Value	Label
55808	High : 55808
-52160	Low : -52160

Color Ramp: [Red-to-Green]

Display Background Value: 0 as []

Use hillshade effect Z: 1 Display NoData as []

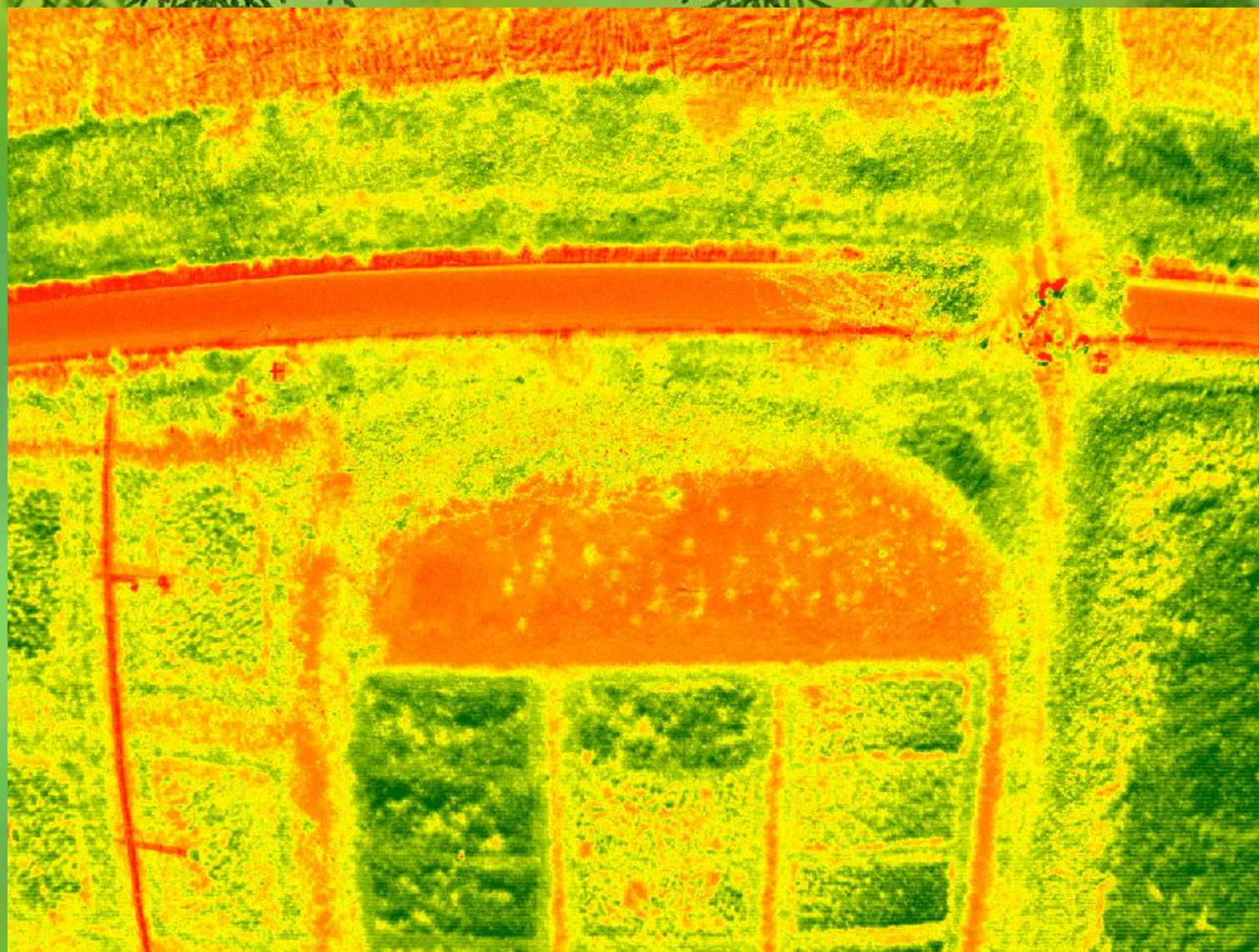
Stretch Type: Percent Clip [] Histograms []

min: 0.5 max: 0.5 Invert

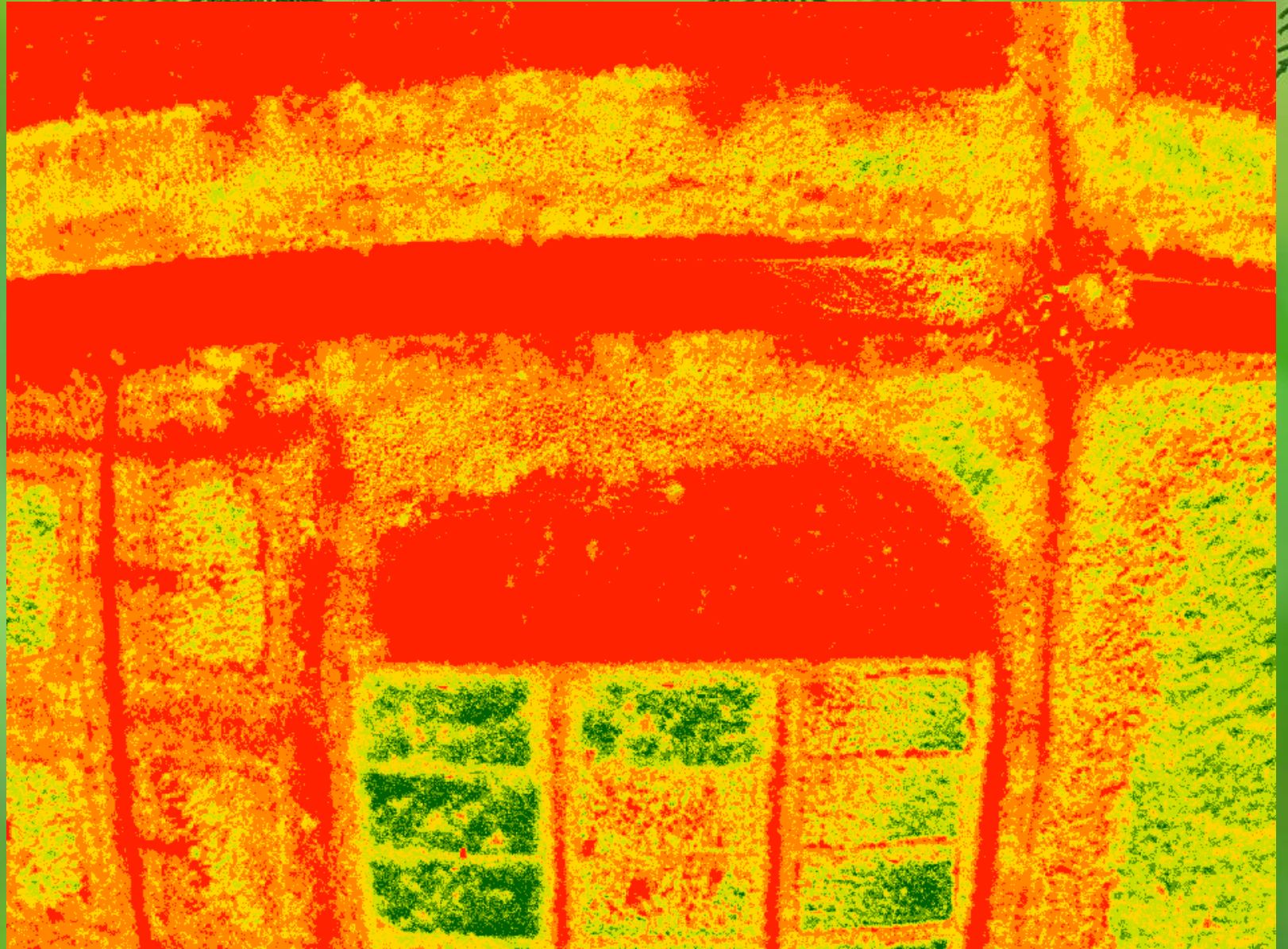
Apply Gamma Stretch: 1

OK Cancel Apply

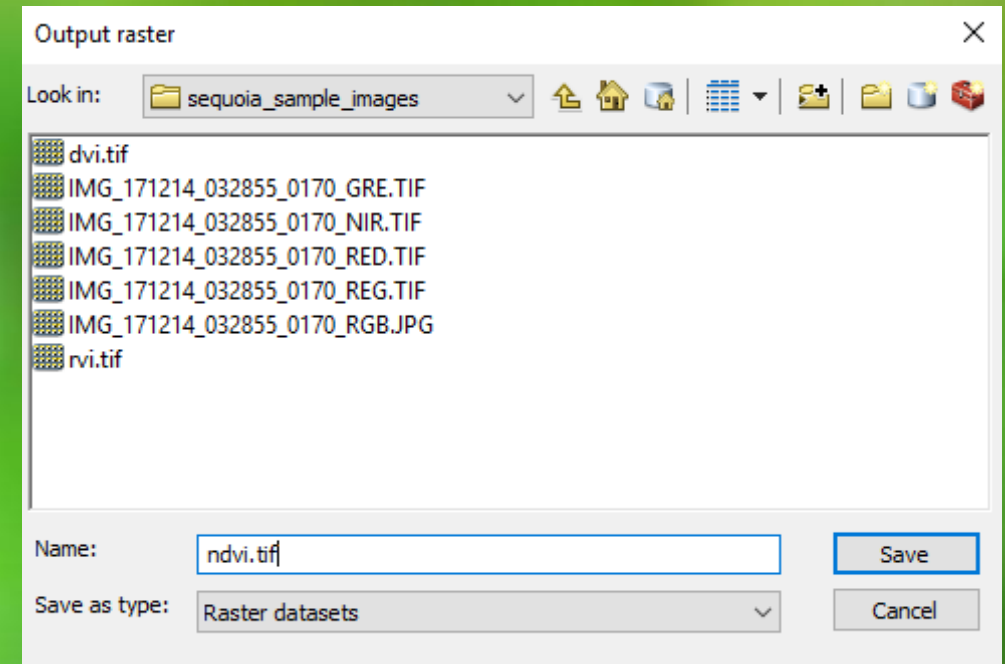
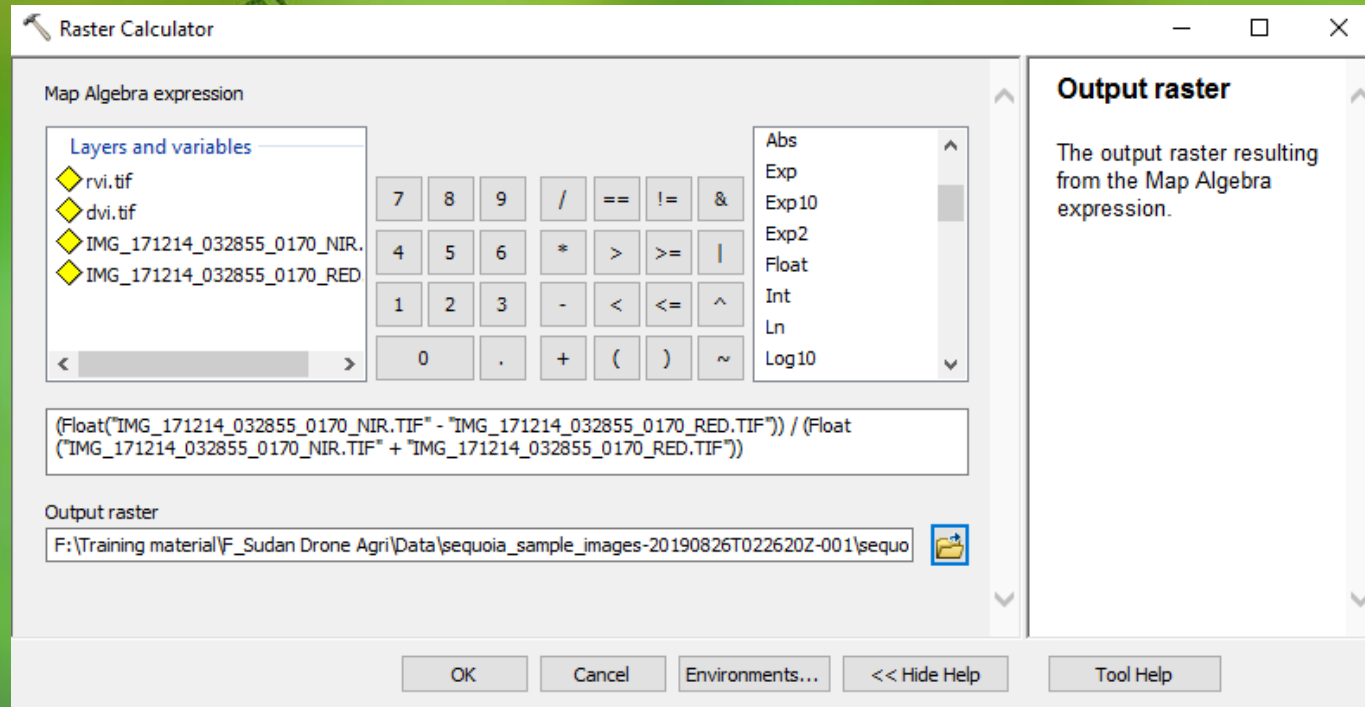
DVI



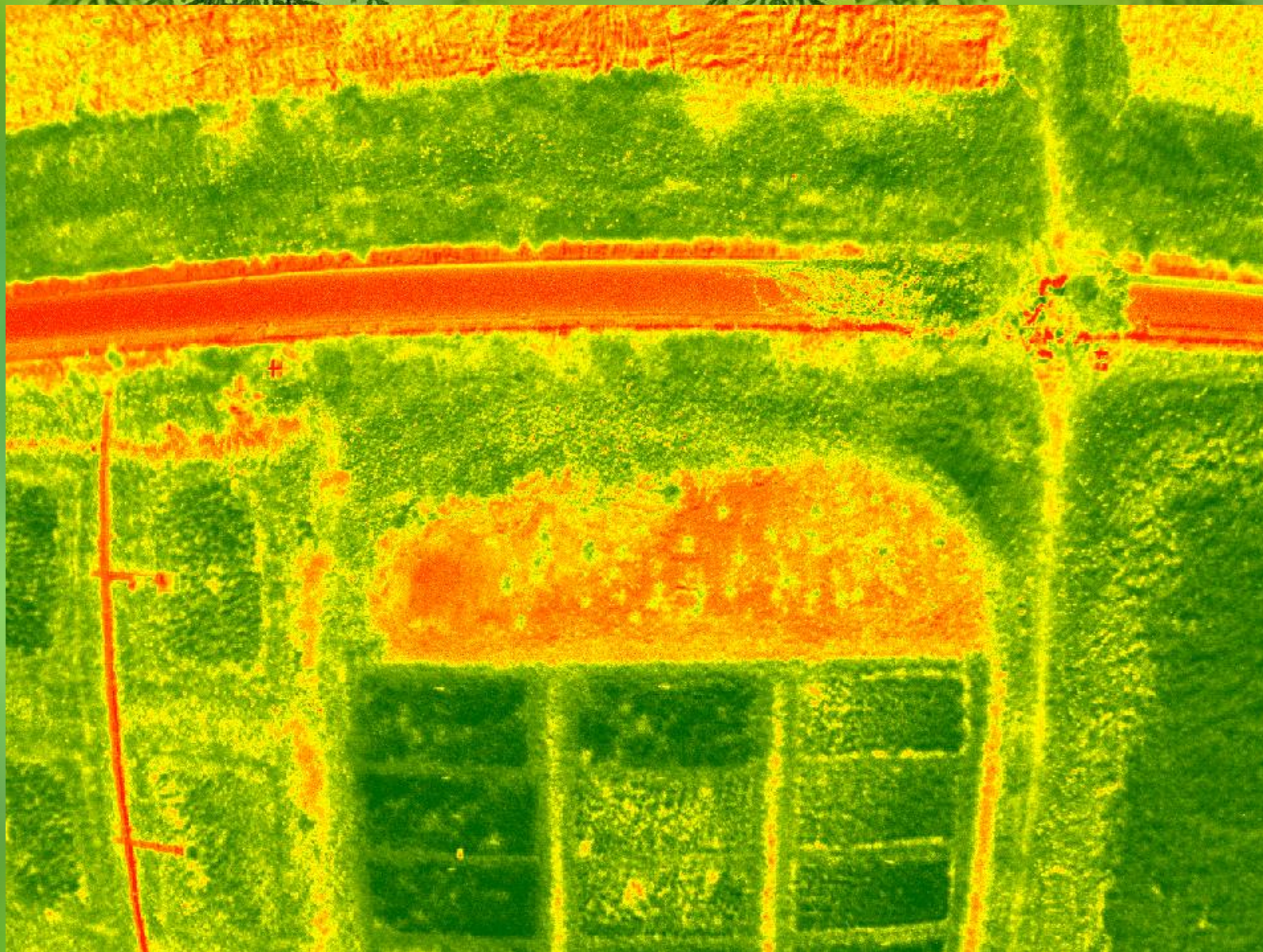
RVI



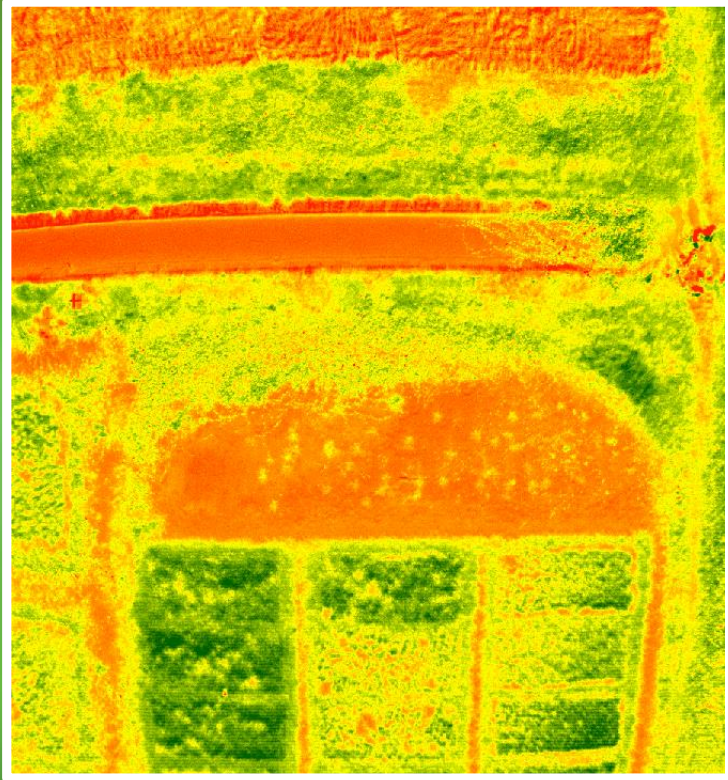
Raster calculator for NDVI



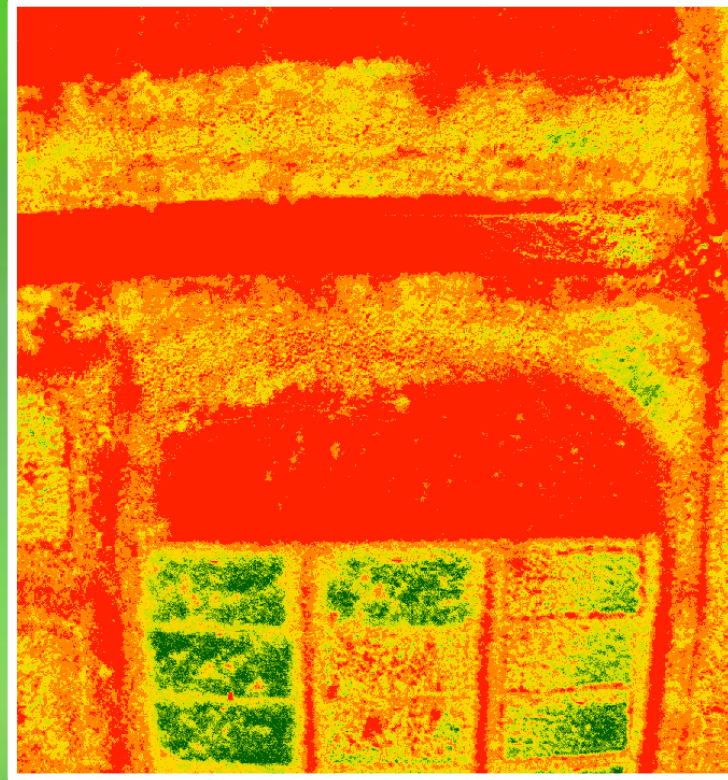
NDVI



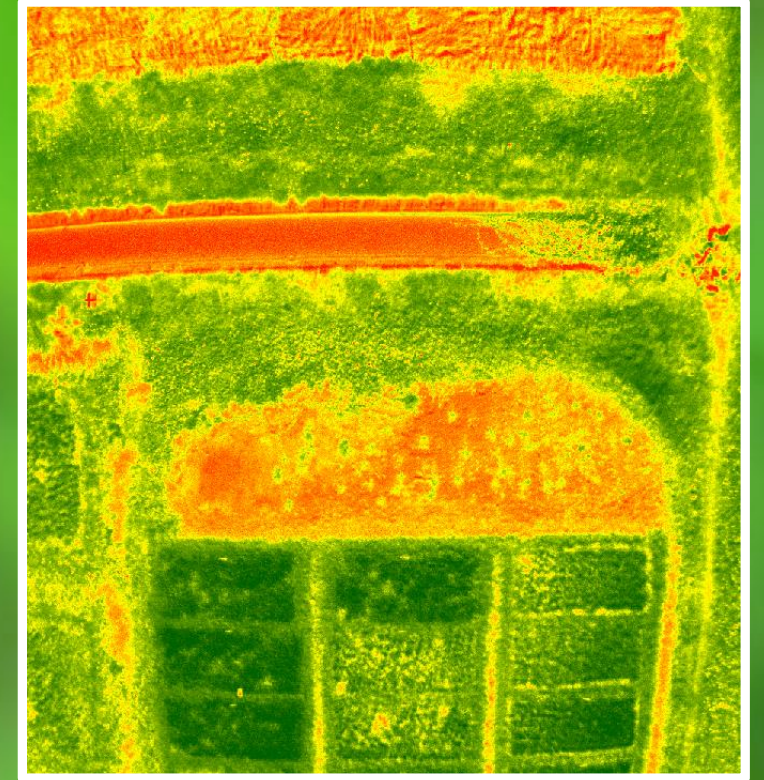
Comparison



DVI



RVI



NDVI

“

NDVI is often the index of choice and generally performs well.

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Thank you