Using Normalized Difference Vegetation Index (NDVI) to Monitor Cover Crops

Matthew Kutugata

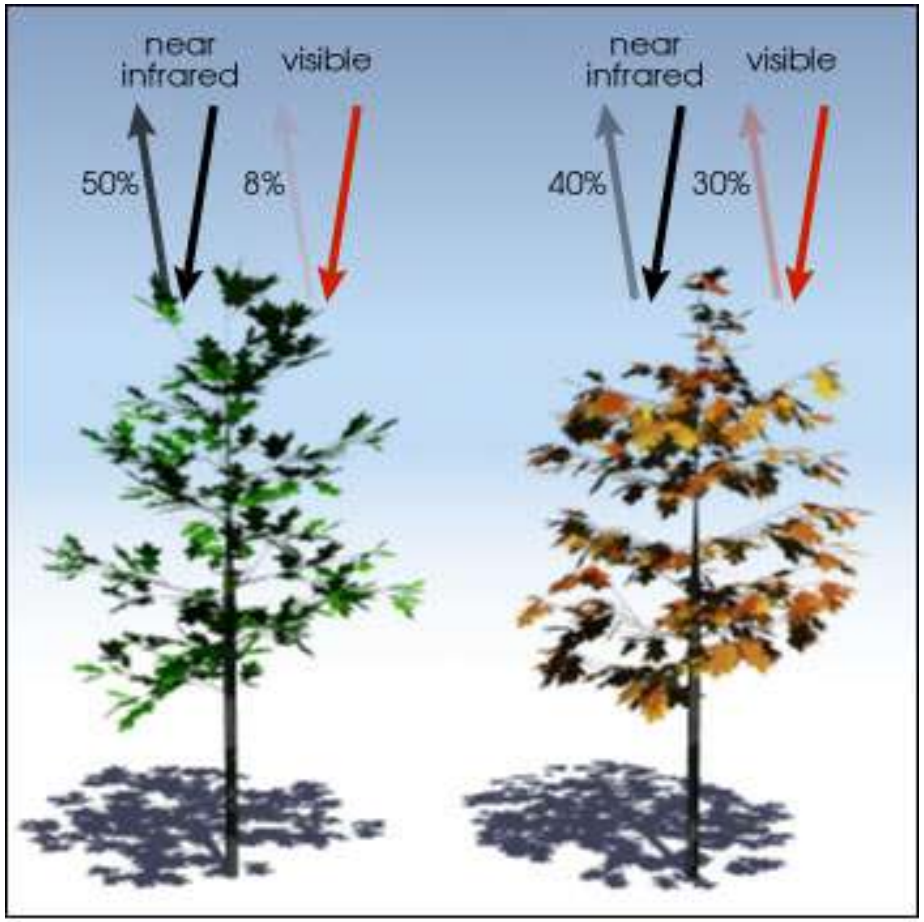
Cover crops research in the LRGV

- Planted to control soil erosion, fertility, quality, water, weeds, pests, disease, and biodiversity in agroecosystems
- Limited on-farm research in implementation of cover crops (**seeding** rates, planting, termination, varieties)
- Traditional quantitative sampling techniques over-simplify complex interactions
- Remote sensing can help us understand field level interactions

Photo: Israel Galindo, SARA, 2018

What is NDVI?

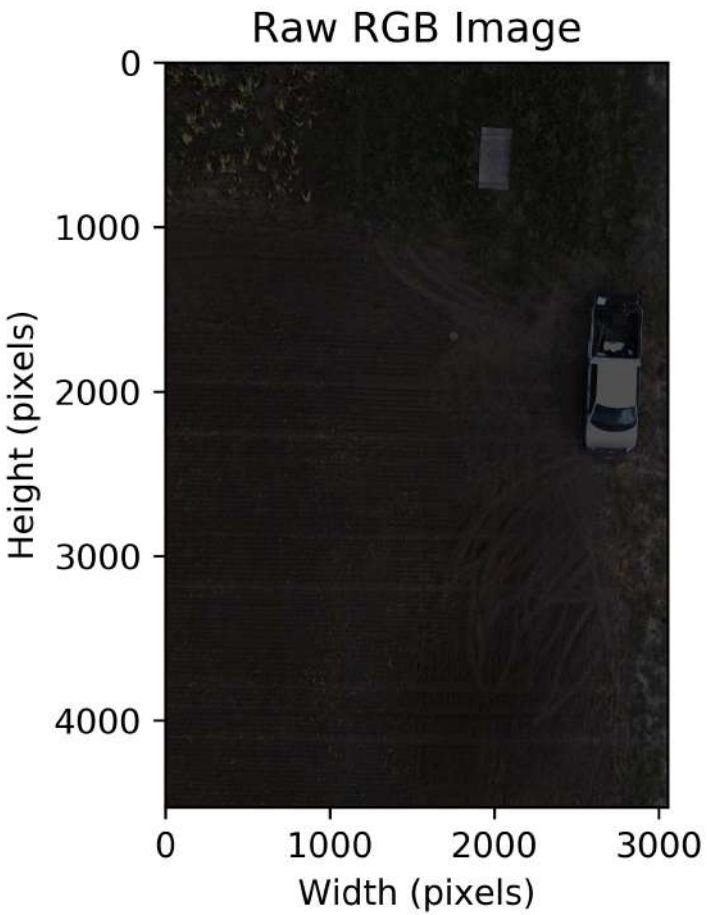
- Quantifies vegetation by measuring the difference between near-infrared bands (which vegetation strongly reflects) and red bands (which vegetation absorbs).
- -1 = water
- 1 = dense green vegetation
- 0 = no vegetation
- $NDVI = \frac{Nir - Red}{Nir + Red}$



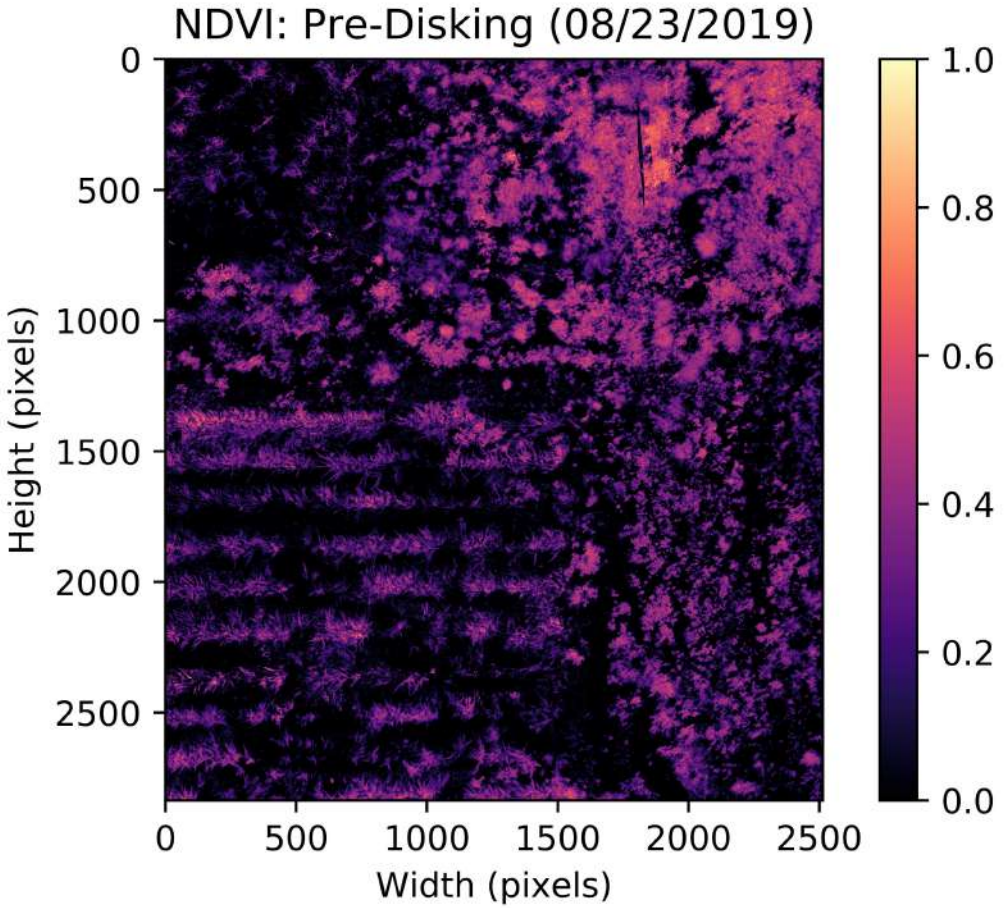
Nasa Earth Observatory, 2000

Pre-processing

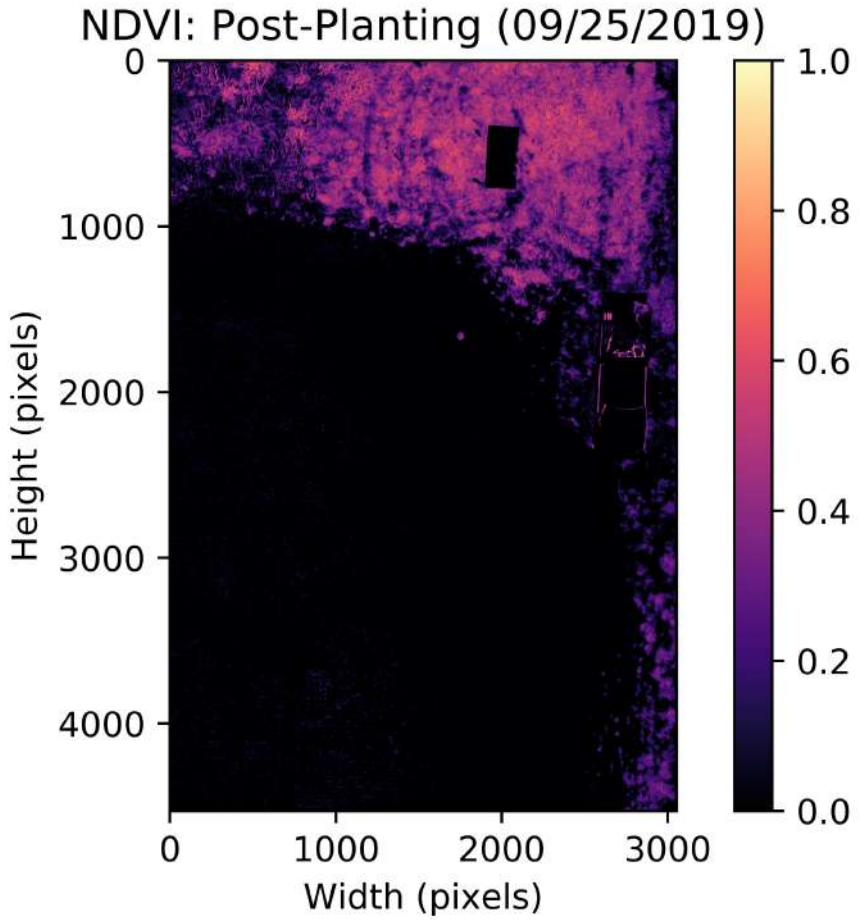
- Normalization
- Visual Inspection (RGB and false color)



NDVI Calculation and Temporal Comparisons



Mean: 0.14543
Median: 0.07042

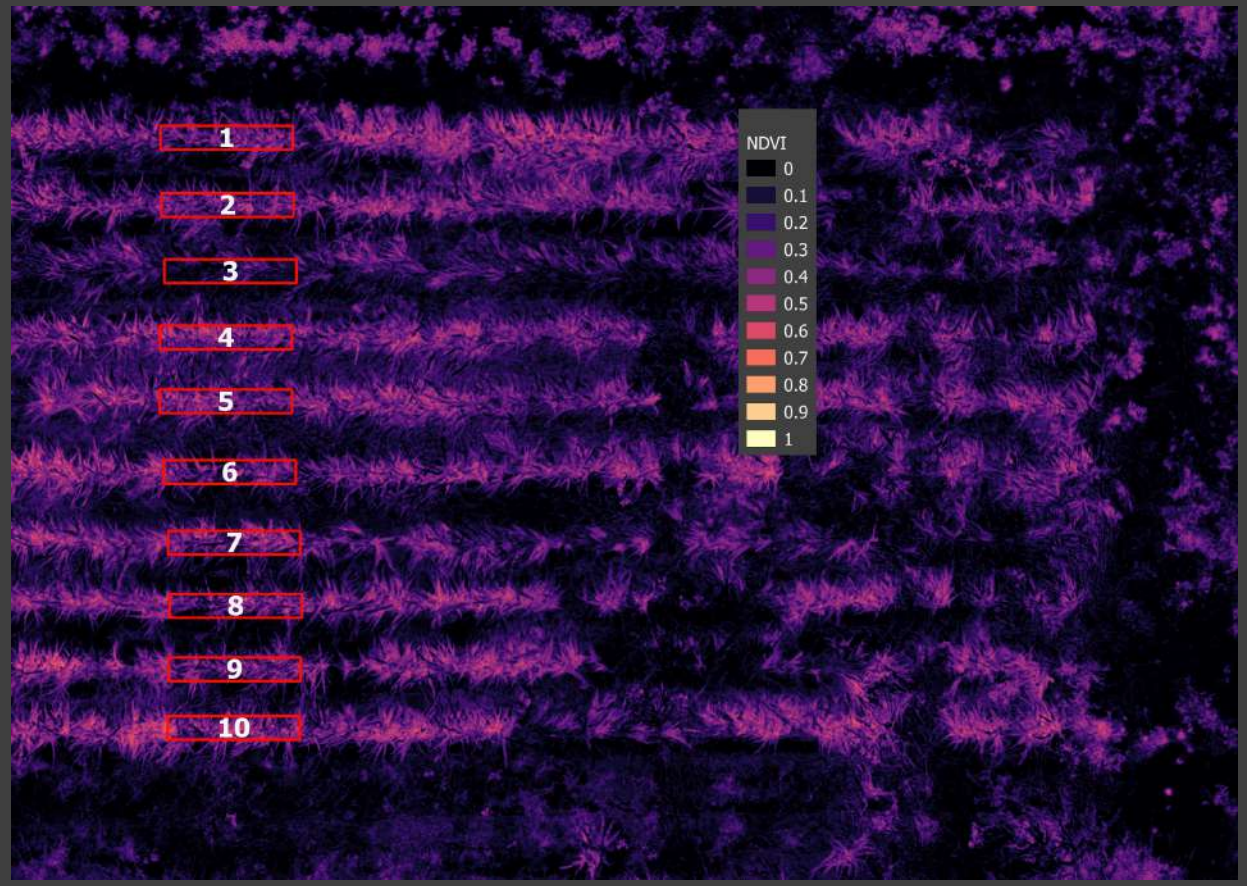


Mean: 0.08579
Median: 0.0

Future Work

Use georeferenced grid sampling areas to see changes in NDVI through time

id	_NDVImean	_NDVImedia	_NDVIstdev	_NDVImin	_NDVImax
1	0.253409814800061	0.261904776096344	0.122921914157132	-0.158730164170265	0.584905683994293
2	0.262781428702438	0.262135922908783	0.113550103218416	-0.107142858207226	0.636363625526428
3	0.103363772561849	0.087719298899174	0.090207792295728	-0.15625	0.471698105335236
4	0.318182694218321	0.314285725355148	0.115272644313151	-0.047619048506021	0.654321014881134
5	0.279736182387243	0.282329991459846	0.114979633056552	-0.095238097012043	0.633802831172943
6	0.233917004763388	0.235955059528351	0.13235478758212	-0.103448279201984	0.612903237342834
7	0.276190064544878	0.280000001192093	0.139569198927488	-0.132075473666191	0.661538481712341
8	0.232277278374558	0.238095238804817	0.139168241561439	-0.159999996423721	0.671641767024994
9	0.251771991181724	0.255813956260681	0.120600314964588	-0.116883113980293	0.638888895511627
10	0.319759442575448	0.320754706859589	0.140796969544054	-0.161290317773819	0.677419364452362



Data Products

RGB Orthomosaic

- August 23rd, 2019
- 0.9 ha
- 30 meters above ground
- 3 m/s
- 75%
- xx images
- 5 hours processing time