

Precision Agriculture Project

TIA Vegetable Research Facility, "Forthside", Forth

Site details

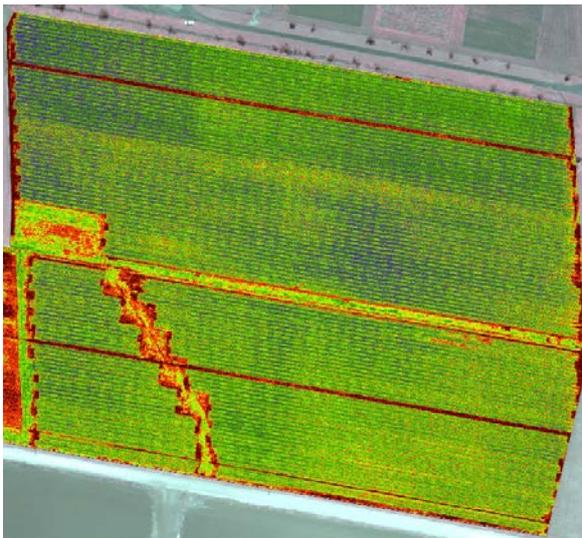
- red ferrosol (red/brown clay loam)
- 6.5 ha paddock, linear move irrigator
- 2015-16 crop – poppies
- 2015-16 crop – fresh market carrots
- representative of north-west coast cropping rotations
- has what are normally considered to be high quality, uniform soils, so a good site to determine if PA is an economic proposition in such a location

Representative data layers

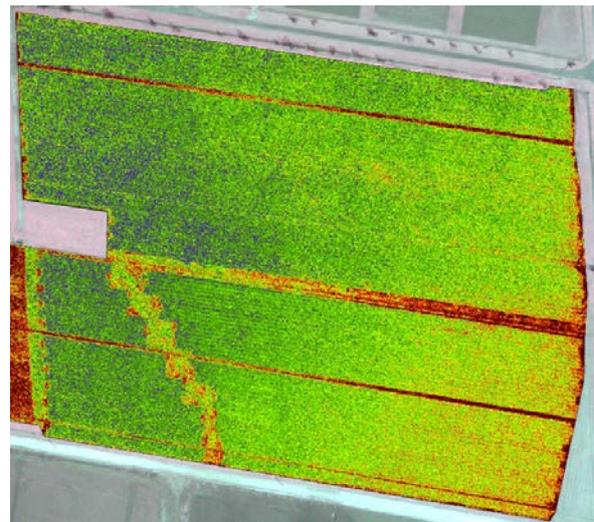
EM38 and other layers have been collected previously. In May 2017, an intensive survey of the whole farm was done using Trimble SIS (Soil Information System).

In-season NDVI images

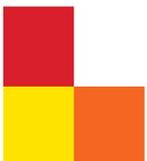
NDVI images were captured by Terrapix two times during the growing season. The satellite service (i-EKbase) that was going to be used proved to be too unreliable due to cloud cover.



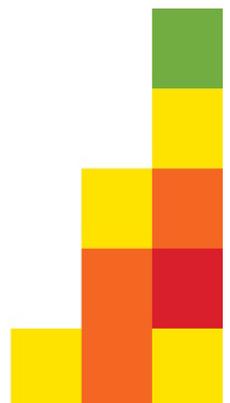
NDVI – 9 Jan 2017

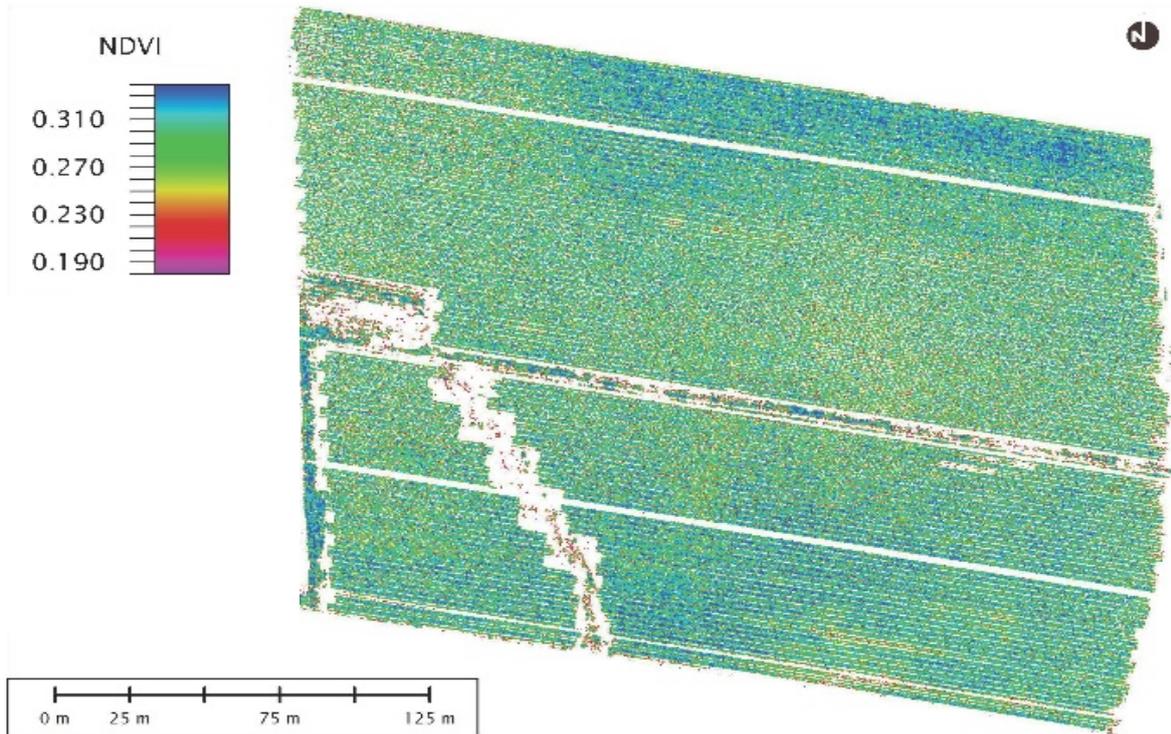


NDVI – 16 Feb 2017

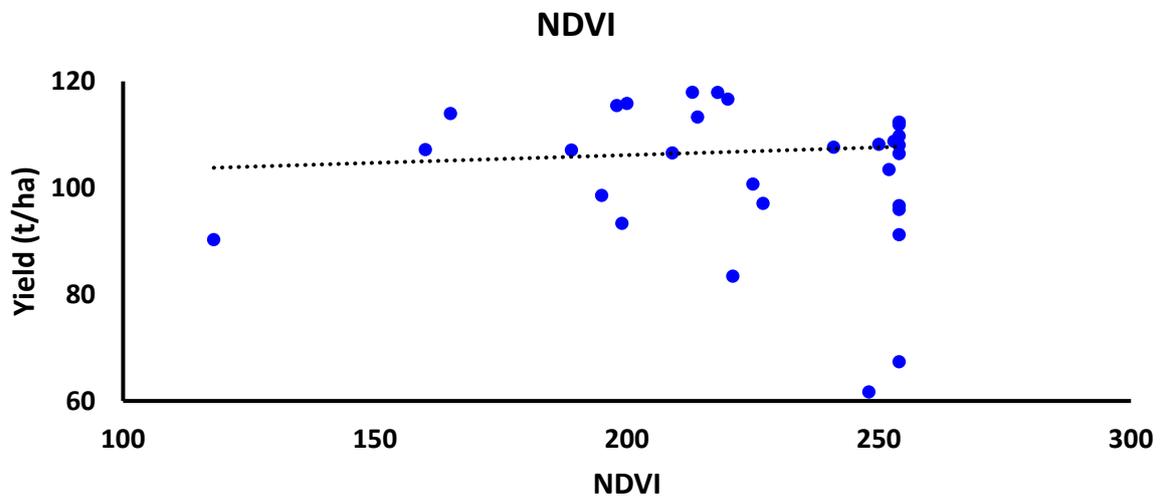


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The 9 Jan image was also processed as NDVI values in a geo-referenced format so it can be loaded into a GIS for comparison with other layers of data.



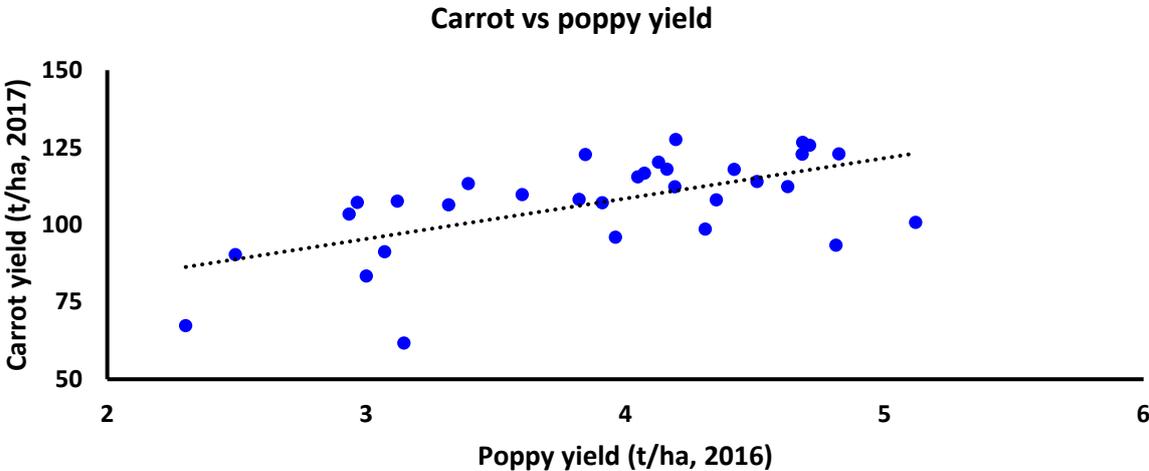
The graph above shows the relationship between yield and NDVI values at the sample harvest points. There is no obvious relationship between NDVI and yield, although that doesn't mean one doesn't exist. We took the imagery about 10 weeks before harvest, and we don't really know when is the best time if we want an indication of yield variation.

Yield variability

Yield samples were taken from 38 points in a random pattern across the paddock with the points distributed according to the underlying EM38 zones. This represents about five

samples per hectare. At each sample location, the crop was harvested from 4 rows x 1 linear m of bed, representing 2 m² of crop area. Samples were graded into size ranges as determine by fresh market specifications. Comparisons in yield variation between 2015-16 poppies and 2016-17 carrots are shown below. Graphs showing the yield variation across the sampling points, and the comparison between years, are shown on the last page.

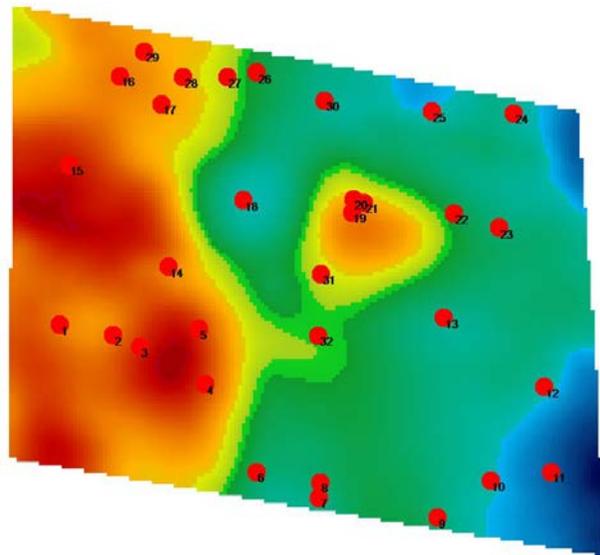
Site	Crop	Measure	Units	Average	Min	Max	Variation ratio max:min
Forthside, Forth	Poppies 2016	Straw yield	t/ha	3.9	2.3	5.1	2.2
	Carrots 2017	Yield	t/ha	107.0	61.7	127.5	2.1



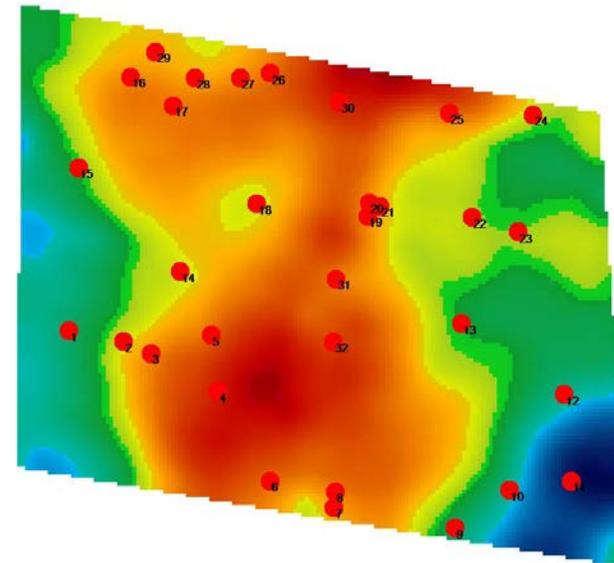
Comments

There appears to be some trend that low yielding zones in the first year were also low yielding zones in the second year, and likewise for high yielding zones. However, there is a lot of variation within that trend. This year has re-emphasised that there are definite limitations to trying to use NDVI images that are not geo-referenced as an accurate tool for crop monitoring and comparing data layers.

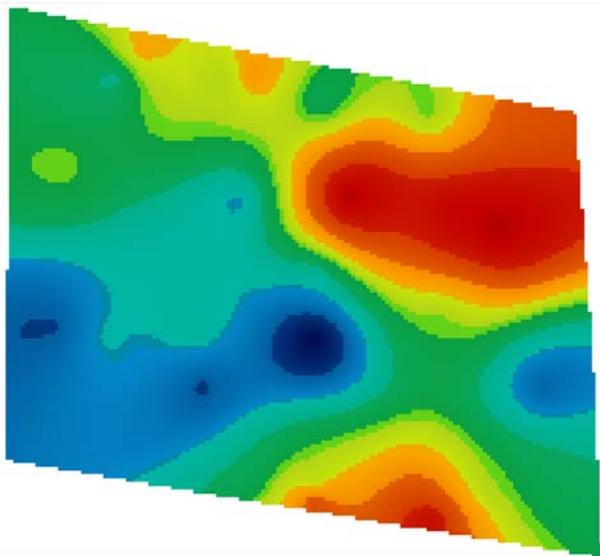
We noted that the yield variability was approximately the same (about 2-fold) for both the 2016 poppy crop and the 2017 carrot crop. The next crop in this paddock is wheat.



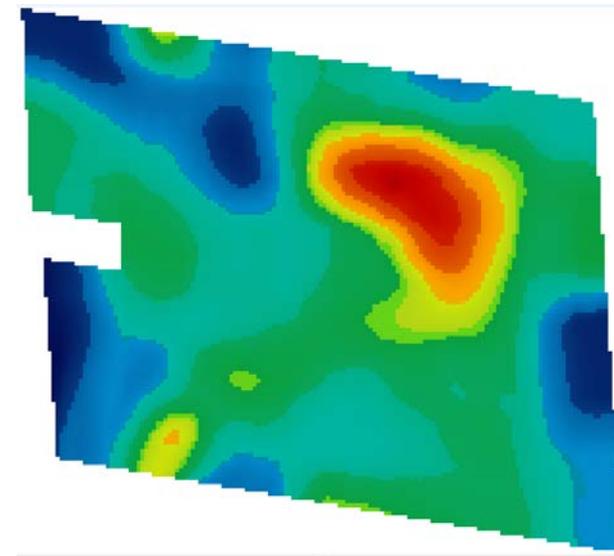
EM38 shallow



EM38 deep



Poppy yield (2016)



Carrot yield (2017)