Precision Agriculture Project

Gibson Agriculture, "Mill Farm", Hagley

Site details

- dermosol (red/brown clay loam over light red/brown gravelly clay, and dark brown clay loam over light brown light clay)
- 45 ha paddock, divided into 4 quadrants, centre pivot irrigator
- 2015-16 crops – processing peas (¼), grass seed (¼) and two varieties of seed potatoes (½)
- two of the crops (peas and seed potatoes) were followed through to yield sampling in the 2015-16 season

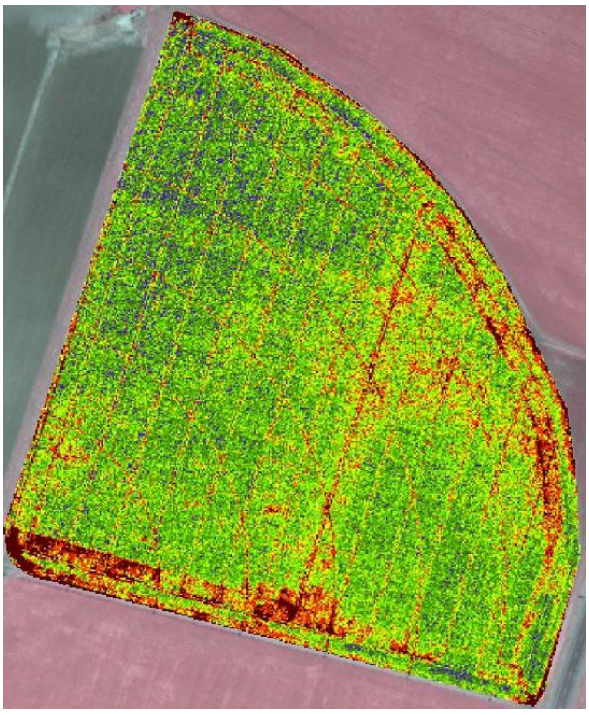
Representative data layers

Various data layers, such EM38 and soil pH, have been collected. Examples are shown on the next page.

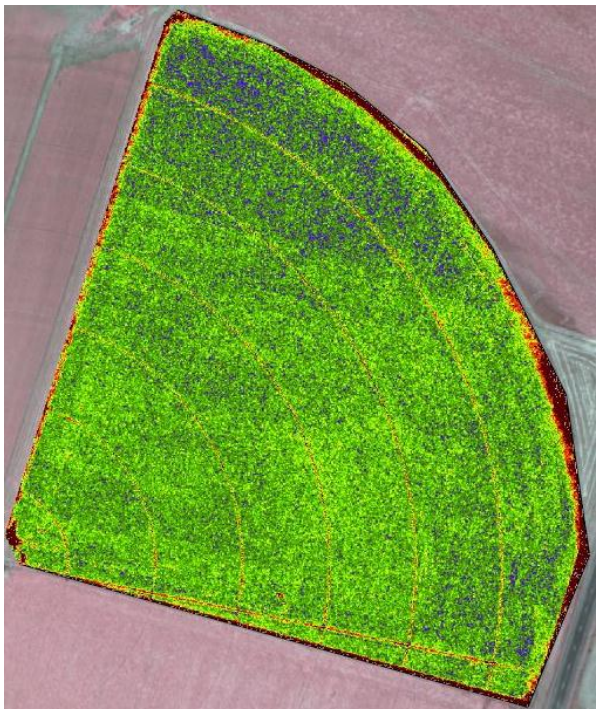
Peas

In-season NDVI images

NDVI images were captured by Terrapix two times during the growing season, as seen below.



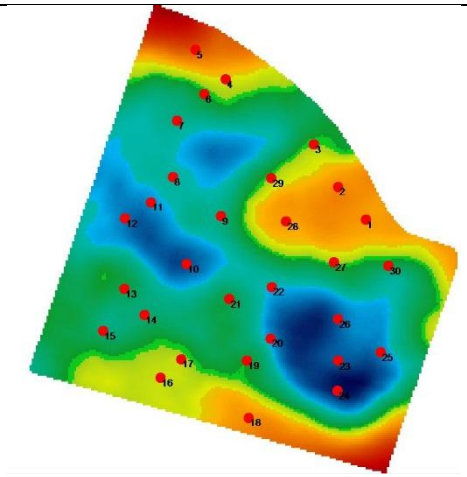
NDVI – 16 Nov 2015



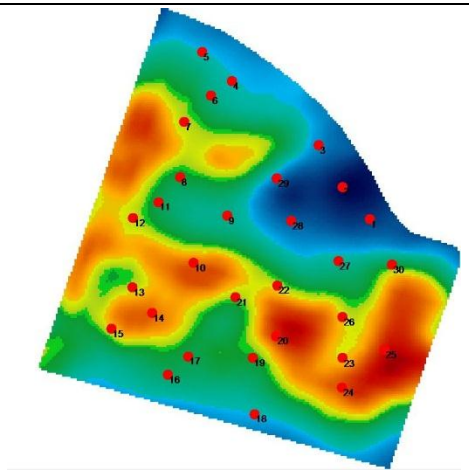
NDVI – 19 Dec 2015

Yield variability

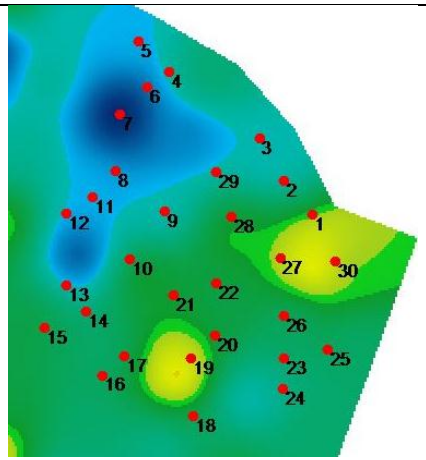
Yield samples were taken from 30 points in a random pattern across the paddock with the points distributed according to the underlying EM38 zones – see images on next page. This represents about three samples per hectare. At each sample location, the pods were hand harvested from a 2 m^2 plot. Samples were shelled and assessed for maturity index and weight. Variation in pea yield and maturity across the sampling points is shown on following pages.



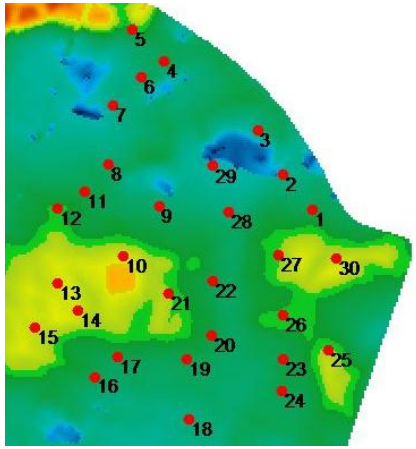
EM38 shallow



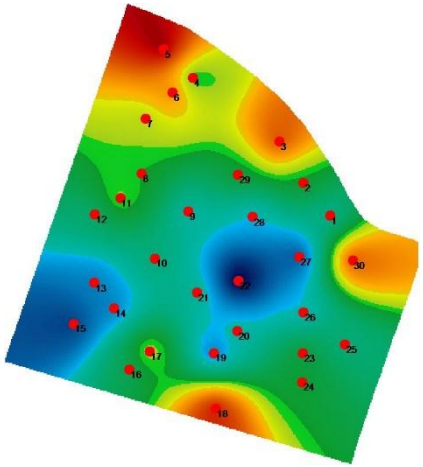
EM38 deep



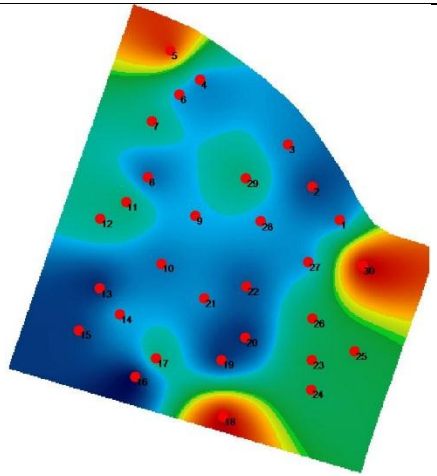
Soil pH



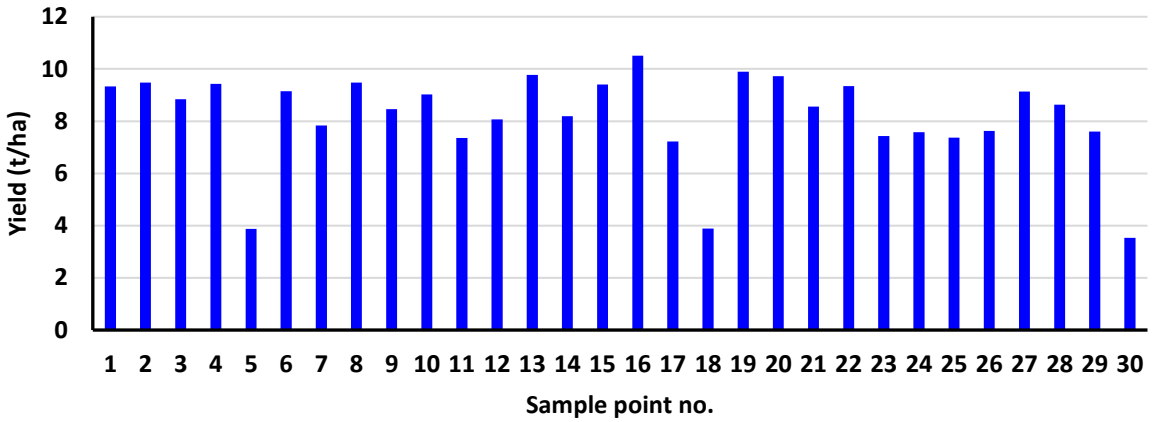
Wetness index

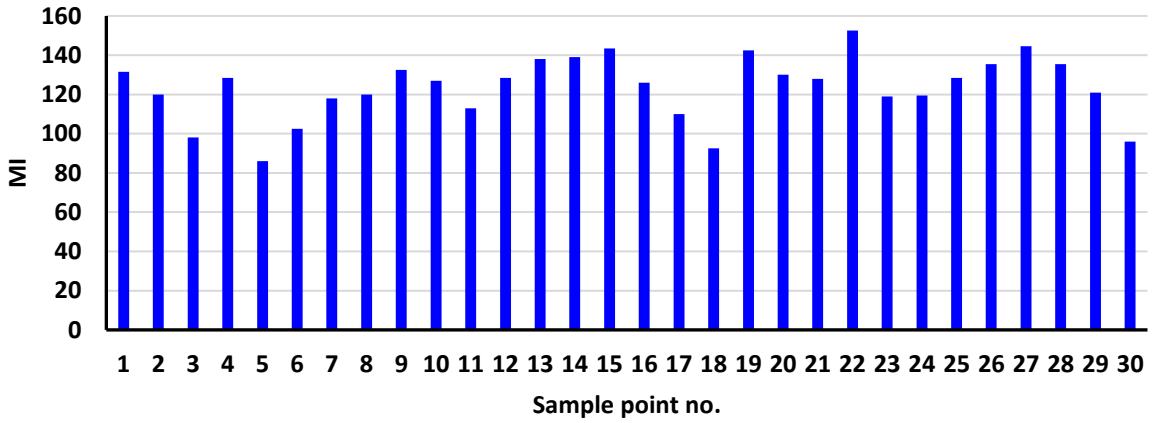


Maturity Index



Yield





Site	Crop	Measure	Units	Average	Min	Max	Variation (%)
Mill Farm, Hagley	Peas	Yield	t/ha	8.2	3.5	10.5	300
		MI		124	86	153	180

Comments

Not surprisingly, the lowest yields match up with the lowest MI readings. The more interesting question is why there are points with low MI, or less advanced maturity. Point 18 (low MI) matches with the area at the southern edge of that paddock that showed low vigour in the 16 Nov NDVI.

The next crop planned for this paddock is poppies.

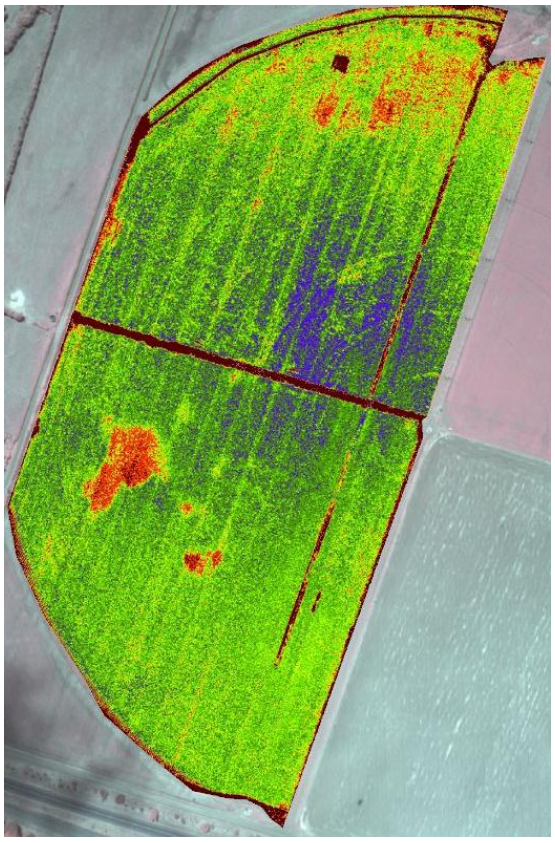
Upcoming data sets:

- P & K nutrient map
- Satellite imagery

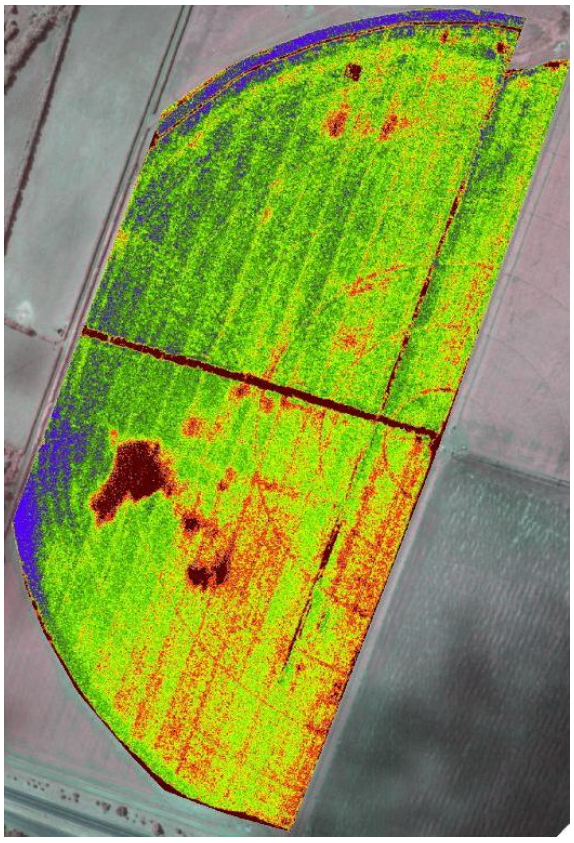
Seed potatoes

In-season NDVI images

NDVI images were captured by Terrapix two times during the growing season, as seen below.



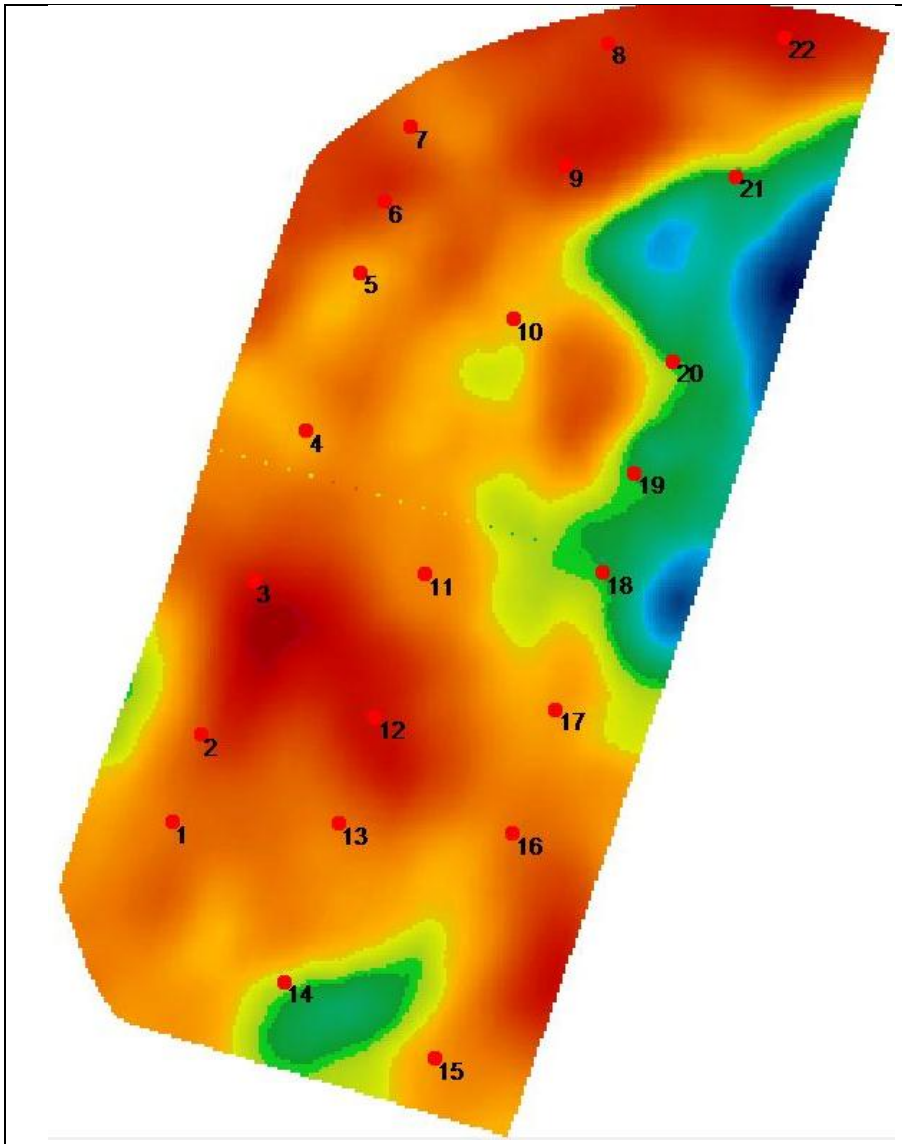
NDVI – 04 Feb 2016



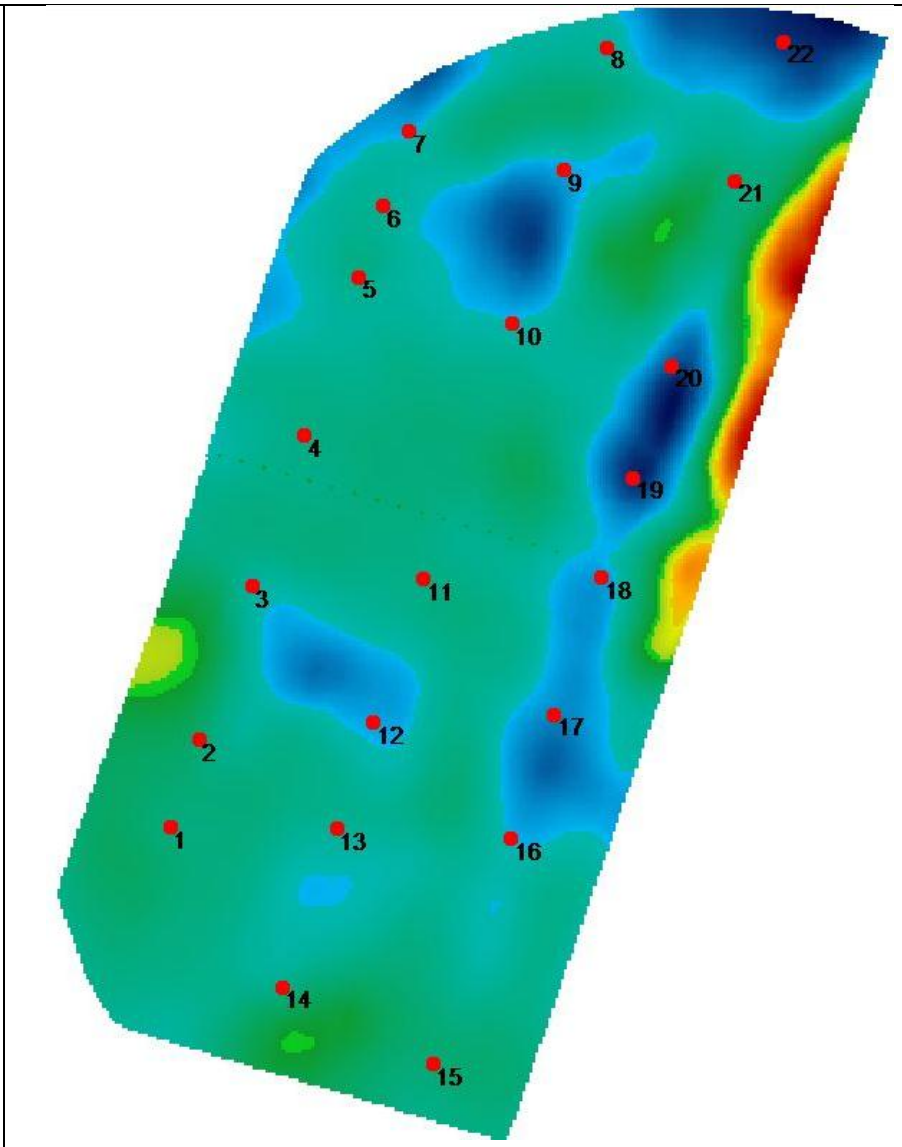
NDVI – 20 Feb 2016

Yield variability

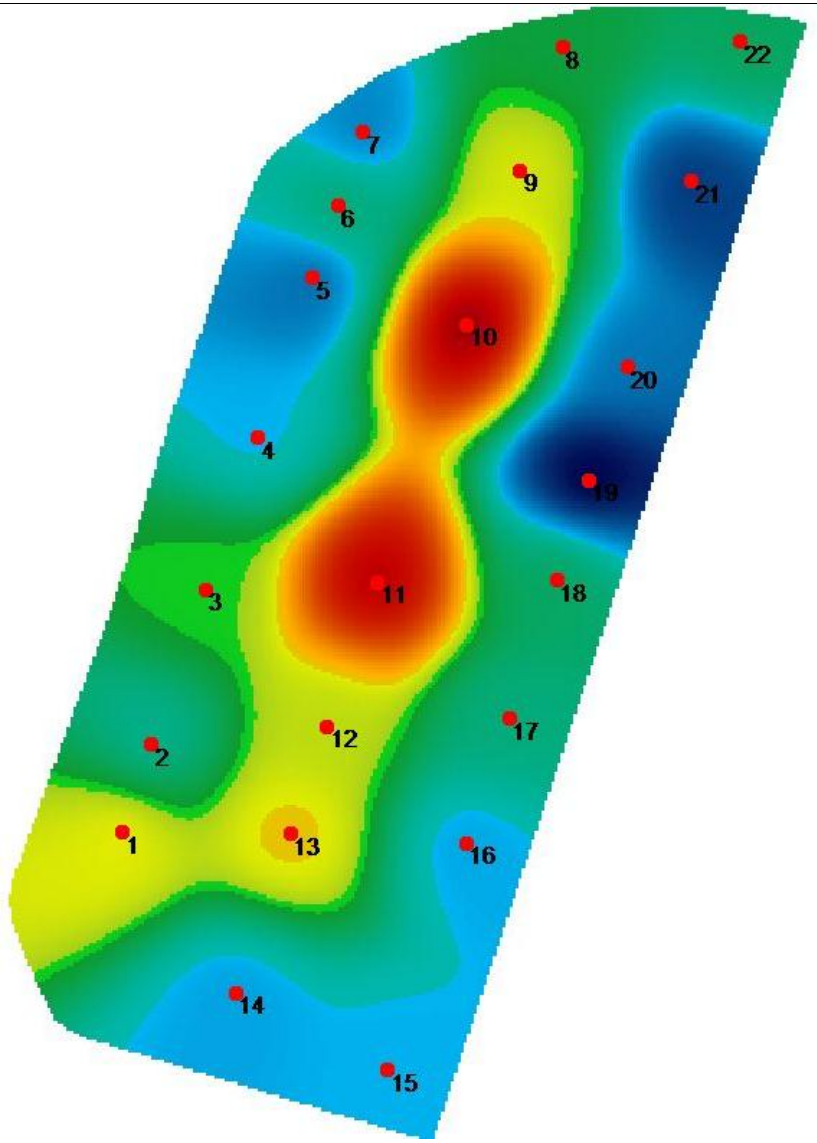
Yield samples were taken from 22 points in a grid pattern across the paddock – see images on next page. This represents one sample per hectare. At each sample location, tubers were dug from 2 rows x 3 linear metres per row. Samples were graded in the field into grades relevant to seed potatoes (<35 g, 35 – 350 g and >350 g) and reject, which were mostly rot due to waterlogging. Variation in total yield and the percentage making grade across the sampling points is shown on the last page. The graded yield is shown as the percentage making grade because there were three different variety by generation combinations across the paddock.



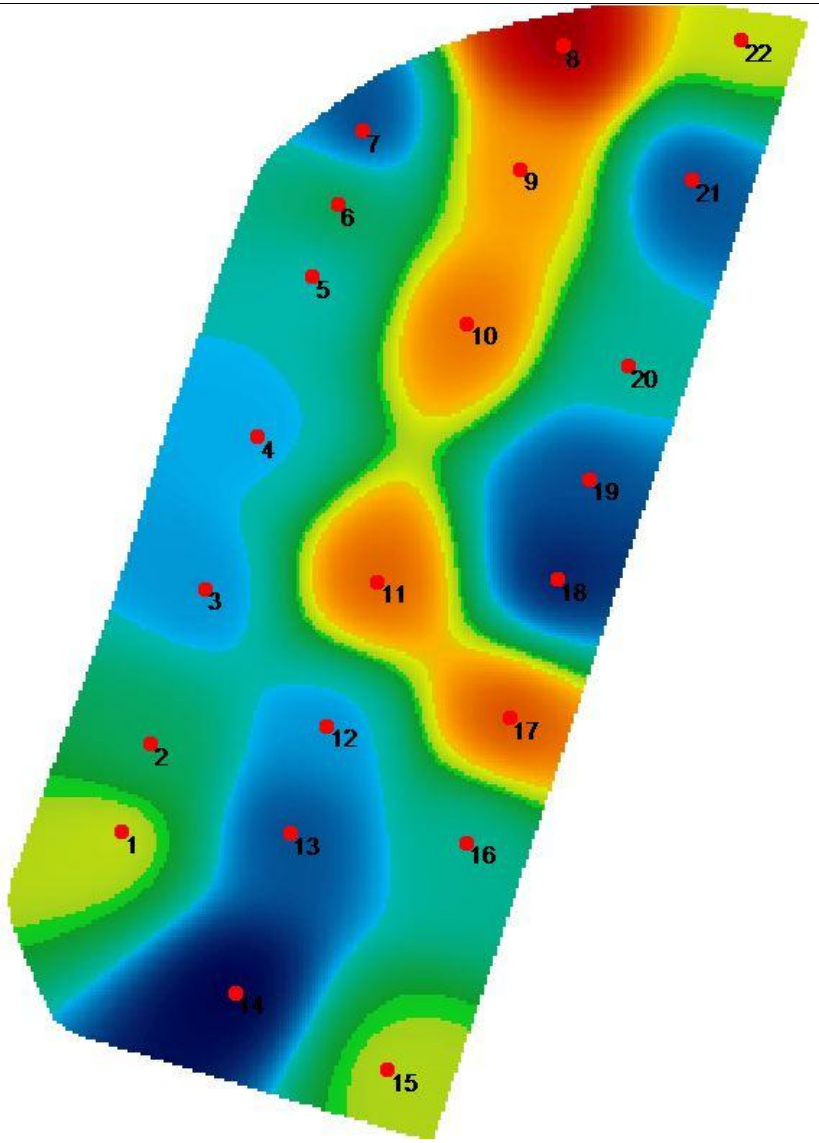
EM38 shallow



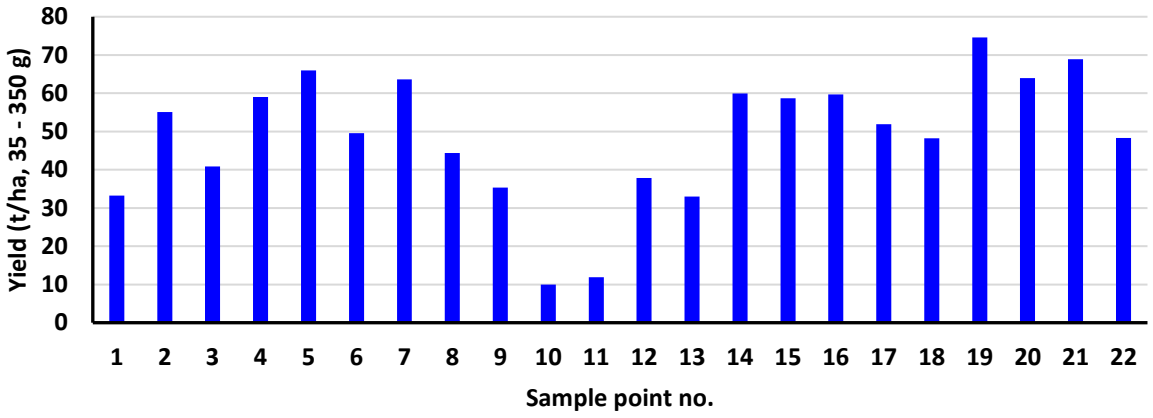
EM38 deep

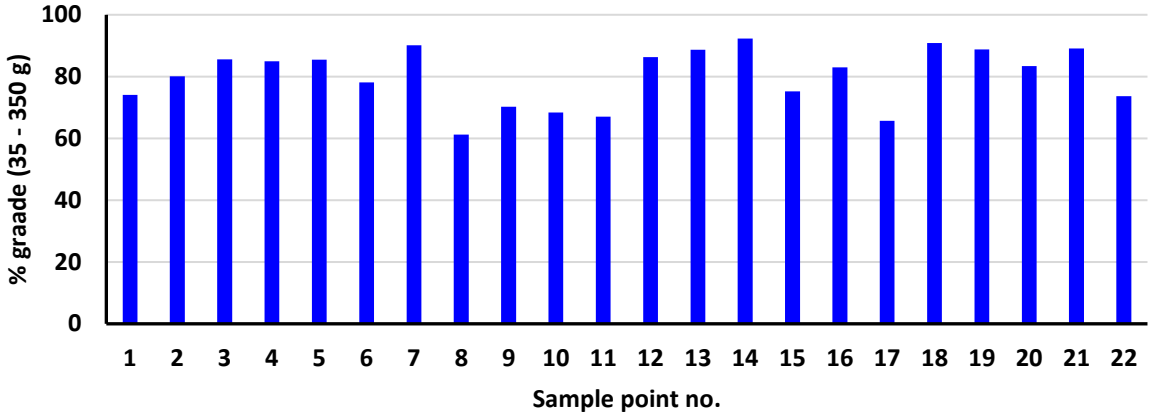


Potato yield (35 – 350 g)



Potato yield - % making grade





Site	Crop	Measure	Units	Average	Min	Max	Variation (%)
Mill Farm, Hagley	Seed potatoes	Graded yield	t/ha	48.8	9.9	74.6	750
		% grade	%	80	61	92	150

Comments

The first NDVI image was taken in early February just after heavy rainfall. At that time, there were some areas showing lack of vigour, with those in the north of the paddock possibly due to lack of water. The second image, taken about three weeks after the heavy rain, shows an improvement in vigour in the north of the paddock, but substantial areas losing vigour due to waterlogging. This was reflected in the yield samples, with substantial rot occurring in wet areas of the paddock. The next crop planned for this paddock is grass seed.

Considerations from this season for following crop:

- Drainage & VR irrigation although pasture/grass seed less susceptible to waterlogging.

What amendments (if any)?

- Restore/expand existing underground drains
- Assess irrigation volume from end gun

Upcoming Data Sets:

- Yield map from grass seed harvest