

The logo for PCT Services features a stylized vertical bar on the left with five colored segments (green, yellow, orange, red, purple) resembling a plant stem. To its right, the word "pct" is written in a bold, dark grey sans-serif font, and the word "services" is written in a green, lowercase, cursive font.



*optimizing
yield and quality*

Is this a your view of Digital Agriculture? *'do farmers really need data to farm?'*



Integrity, Quality, Innovation and Value in agriculture!!!

Have you been consumed and confused by

- Venture capitalists, start-ups and foreign companies with no idea.
 - 42 is the ultimate answer to everything , not NDVI. 😊
- This how you feel?



In the real world.

Growers are not going broke from not adopting PA/Digital Agriculture. They are however at risk of being led down paths and making some bad decisions.

There are no silver bullets.

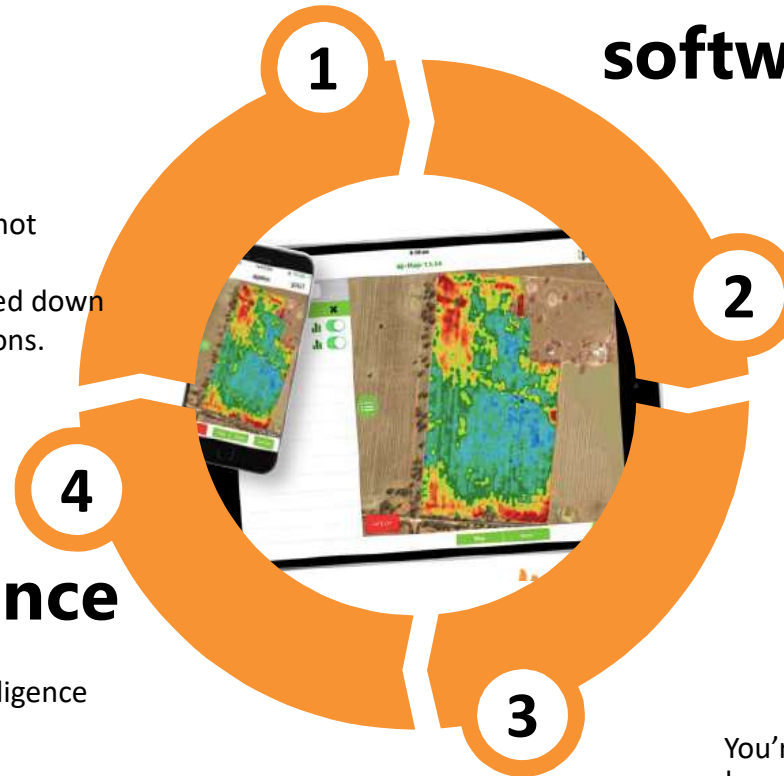
Human Intelligence

With Machine Learning and Artificial Intelligence whose business is at risk.

Consultants and Growers!! Will your data be your demise.

Will your decisions become automated? Probably.

Will the grower receive automated bad decisions. Absolutely.



Its not about software

you/all need software to make it easier and more scalable.

Mostly it all does something to help.

None of it will help if you don't know what you trying to achieve or how to go about it.

Computers are dumb

Quality of data

Digital Agriculture has near zero quality control.

You're going to hear a lot about machine learning and AI – but what's the reality

- [Quality Data, a must have for AI](#)
- [Preparing for AI: The Impact of Clean Data](#)
- [Bad Data Is Ruining Machine Learning, Here's How To Fix It](#)
- [Data Quality in the era of A.I.](#)
- [You can't build enterprise AI if you suck at data & analytics](#)

Where do mistakes get made?

By following processes from other countries, especially North America.
e.g. Grid Sampling often doesn't benefit the farmer. That's about selling fertiliser.

Thinking that you will save money doing variable rate nutrients.

If you do, you are probably over applying anyway. You want to put the fertiliser where you get best bang for your \$\$

Lack of input from either agronomist or owner always makes a fail.

Using the wrong data to make decisions.
NDVI is not quantitative.
NDVI does not measure variability, it shows where it might be. Yield monitors measure yield.

Remote sensing is not nitrogen mapping.

Focusing on zoning and sampling for nutrition and not focusing on water.

Understand **water**, then **water** some more and then a bit more on **water**, then nutrition will make more sense.

The truth about case studies?

- Ever seen a bad case study 😊
- Selective fields often have the farmers attention – ‘there is a trial in there so we better make sure we do everything on time’. Instant success.
- Use case studies as a guide to decide what to test yourself.
- Case studies on controlled traffic, drainage etc are typically transferable.

Where do you get information – you generate it yourselves.

- Testing on your own farms, under your own conditions and agronomy and management is the only way to build knowledge.
- You are testing cause, effect and response so the design of the trial is critical – so is the analysis.

So what's a good process.

Workflows and processes - KISS

**Respond & implement
from what you learn.
Get a process and stick
to it. Tweak it.**

**Collect the right data,
for the right job**

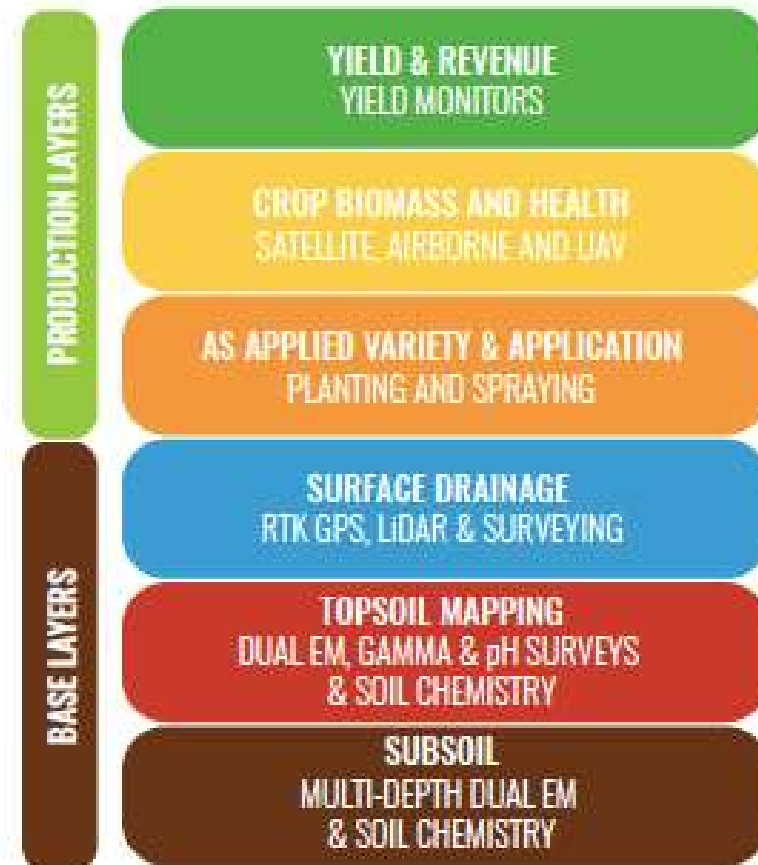


**Process correctly.
It's data not
pictures**

**Analyse and test.
There is no need to
guess, measure, test,
analyse and measure.**

**Quality control.
Understand what's
in front of you.**

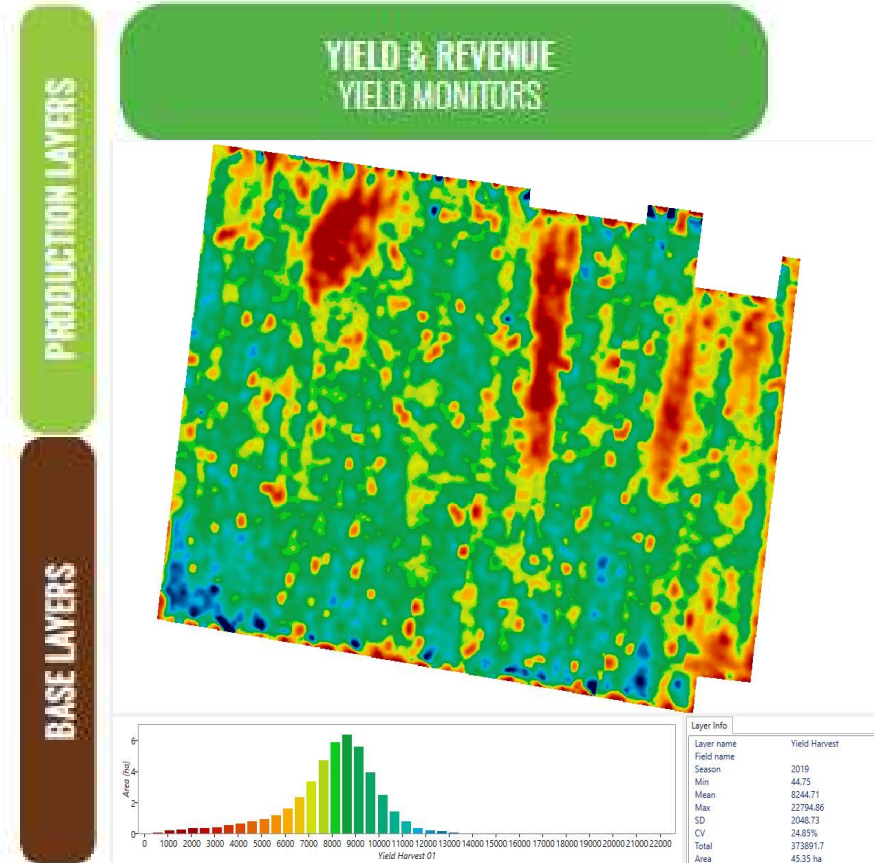
Layers for Analysis



Measure Variability

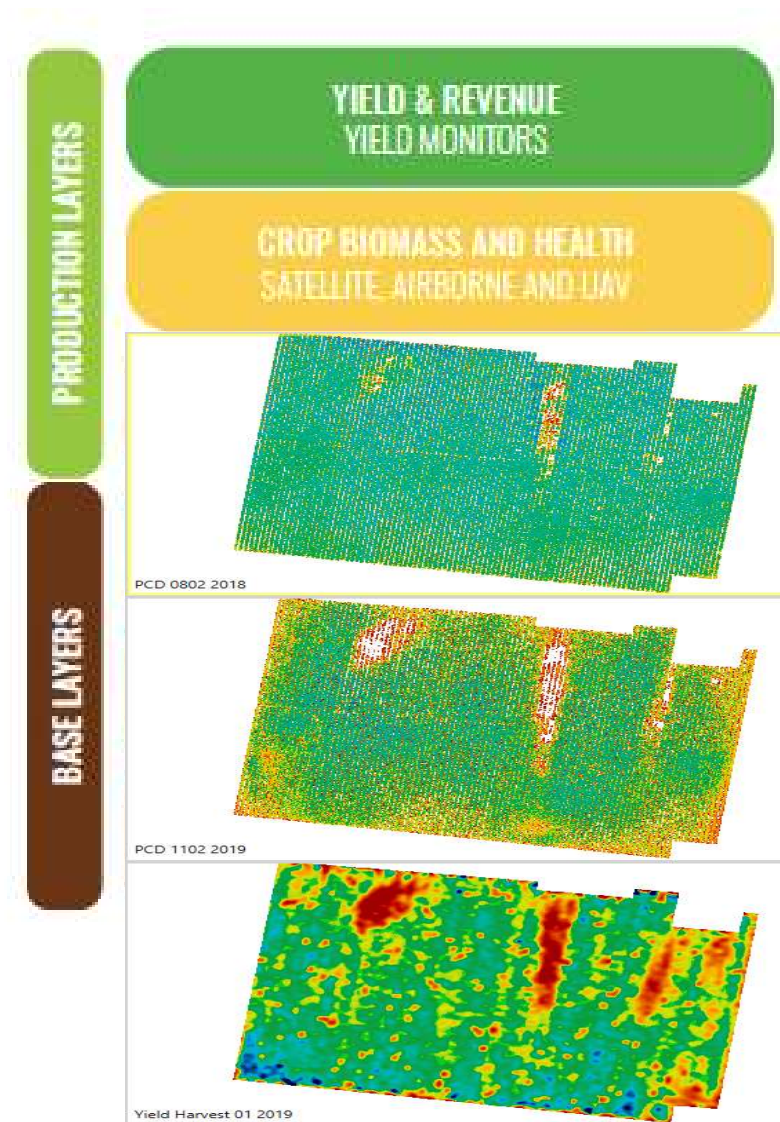
- Yield Mapping
 - Weigh cells on harvesters
 - Trash, wet weight, sensitivity
 - Optical sensors – trialing, holds promise
- Use stats not colour.
- CV < 7% walk away and look at other blocks.
- CV >8<15% show some interest.
- CV >16% get your head out of the sand.

Layer name	Yield Harvest
Field name	
Season	2019
Min	44.75
Mean	8244.71
Max	22794.86
SD	2048.73
CV	24.85%
Total	373891.7
Area	45.35 ha



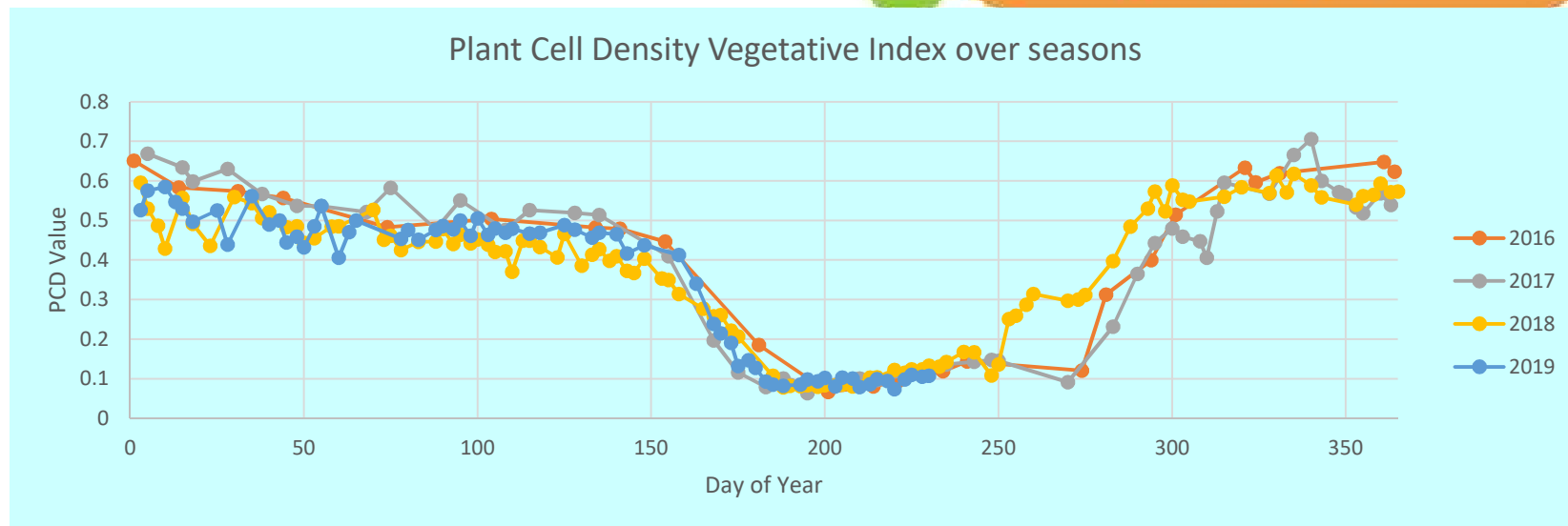
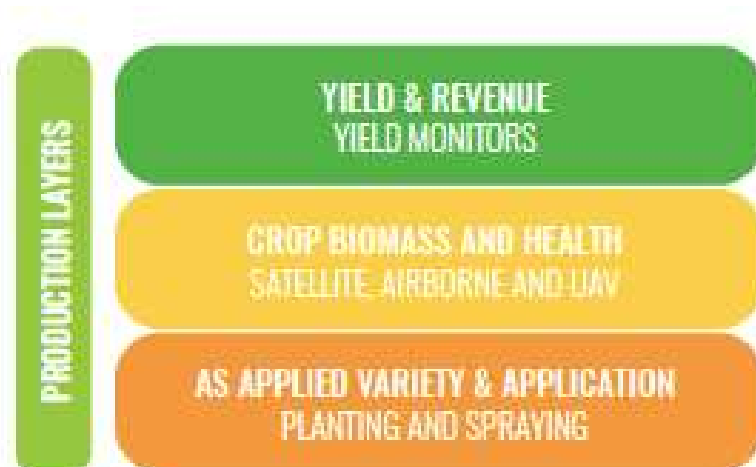
Get some history

- Vegetative indexes like NDVI/PCD are easy to get a “history”
- It’s better if you ground truth it.
- Don’t use it if you are going to guess.
- Good to check dry vs wet years.
- Do high biomass areas run out of water.
- Determine regularity or stability.
- Aerial/Satellite/UAV
 - Repeatability
 - Resolution
 - Cost



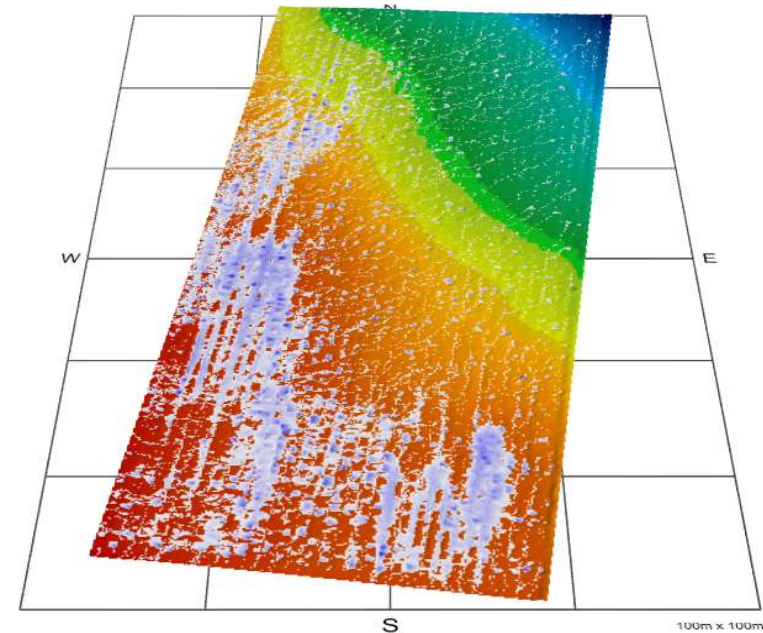
Get some history

- NDVI/PCD is easy to get a “history” now we have reliable and multiple satellites available



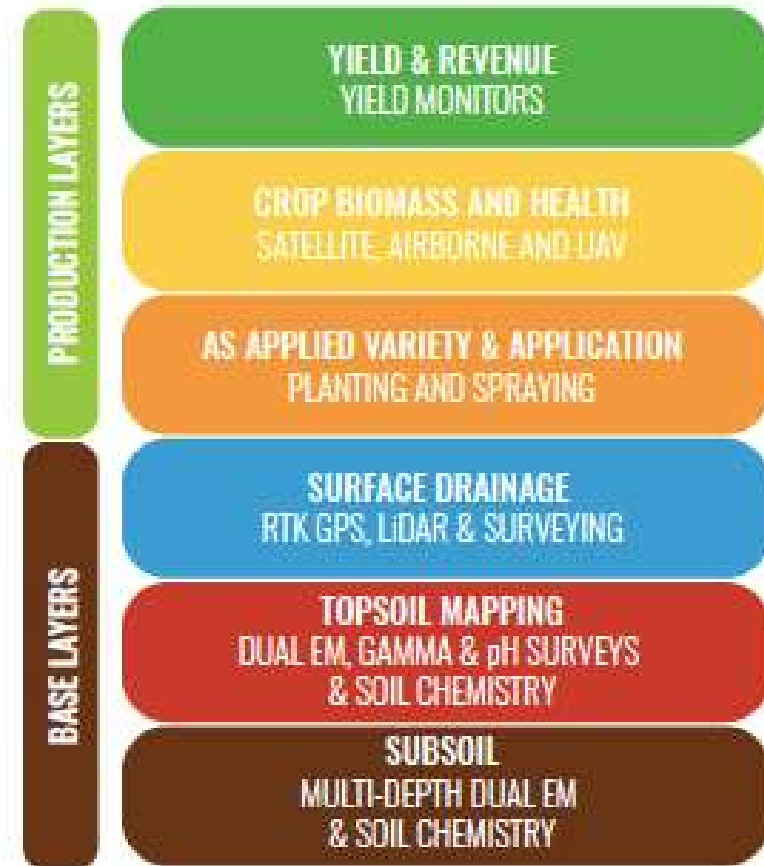
All answerable q's

- Elevation - surface water movement.
- Where does water shed and accumulate.
- Where does it
 - lay,
 - water log
 - reduce yield and
 - affect trafficability
- Probably the most important layer to analyse – water is king;
 - Too much, too little, just right spatially, especially if fertigating



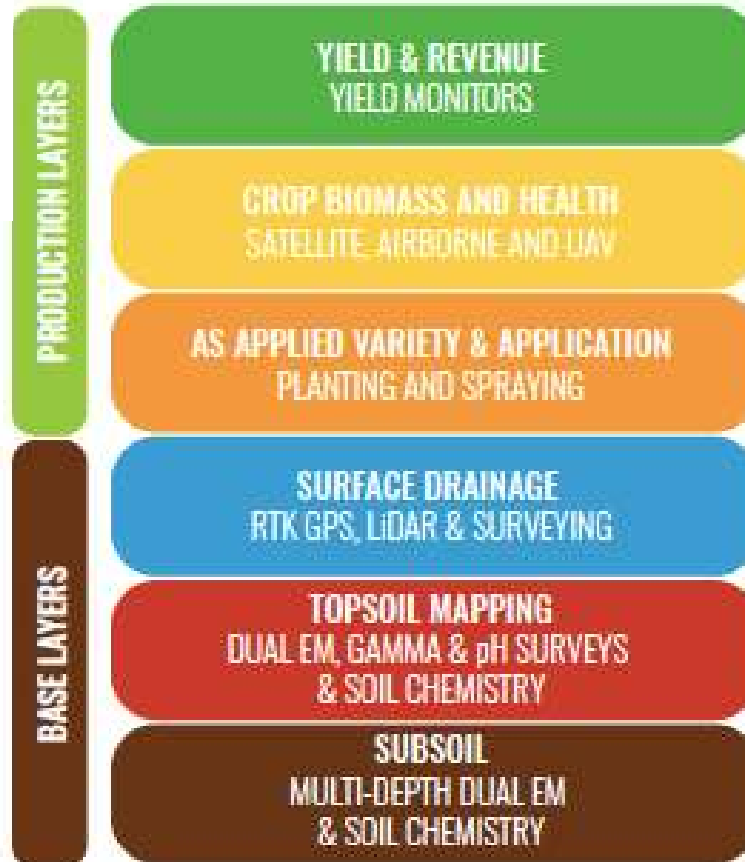
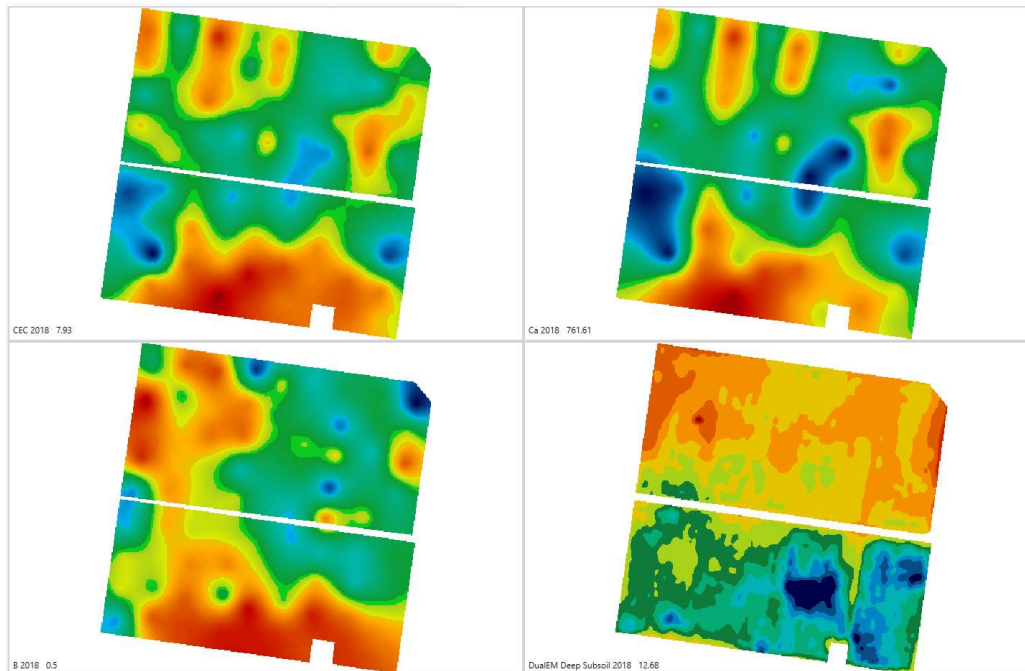
All answerable q's

- Soil Surveys
 - Electrical conductivity (EC)
 - Gamma
 - pH
 - Nutrients
 - Soil Health
- How does the soil surface effect infiltration?
- How much water does the profile hold?



All answerable q's

- Soil Surveys



All answerable q's

- Soil Surveys
 - Make some sites repeatable each season to track trends (and take deep samples as well as shallow), whilst sampling other areas to build a bigger picture

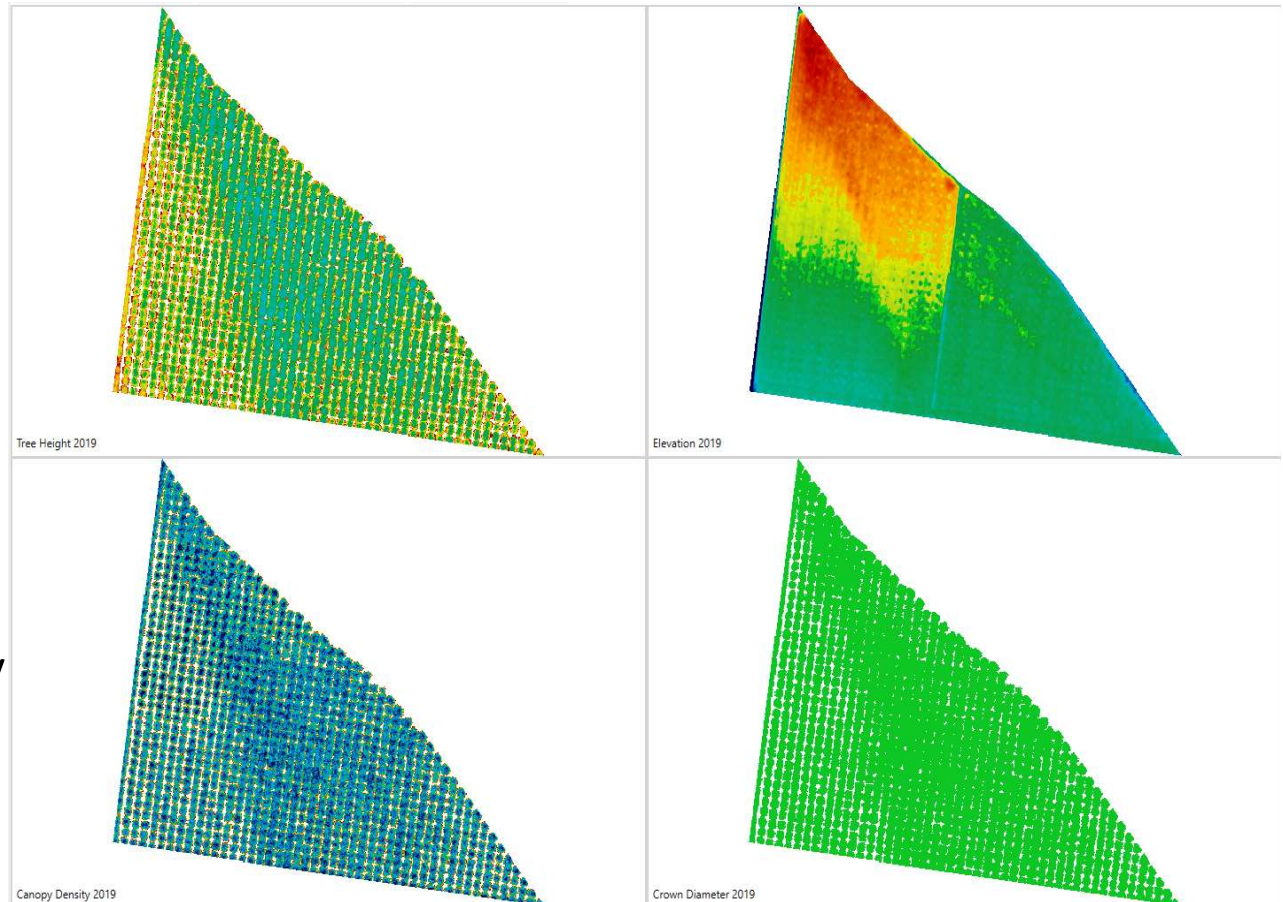




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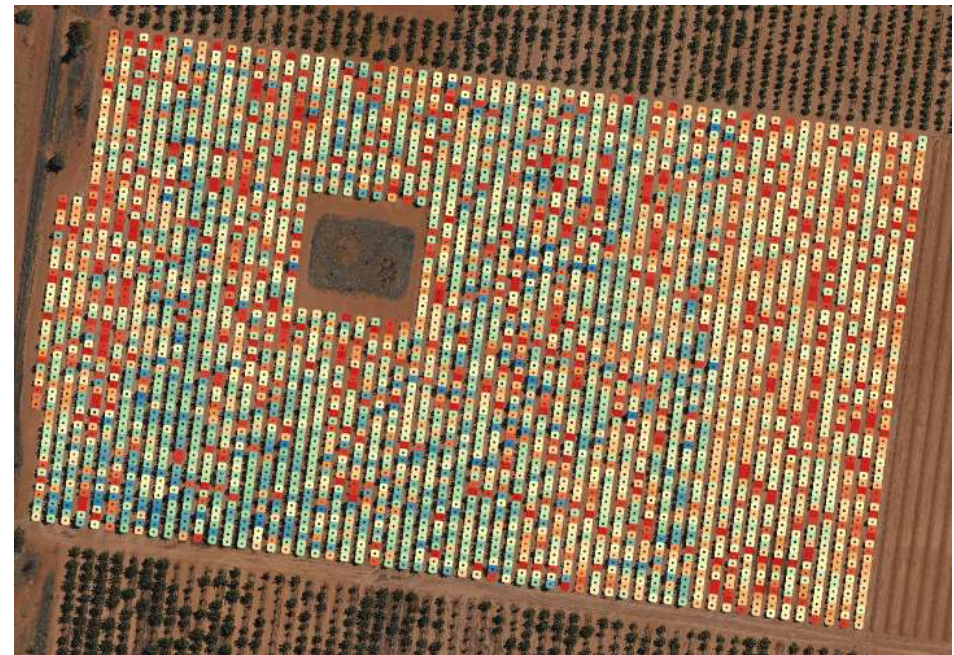
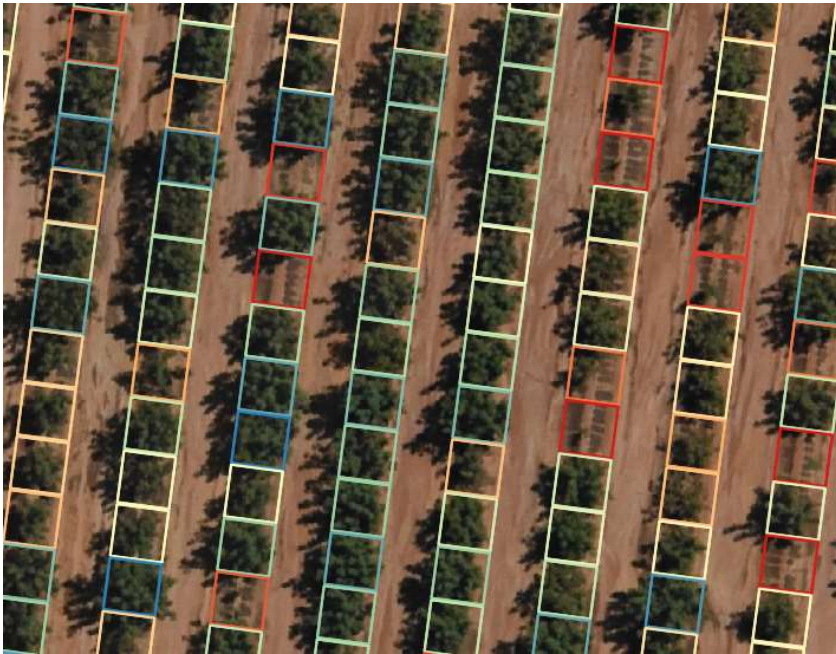
Tree performance monitoring

- LiDAR (Light Detection And Ranging)
 - Airborne and ground Laser system that emits light pulses and times their return to a sensor
 - Done well, LiDAR can supply a very accurate elevation and canopy surface



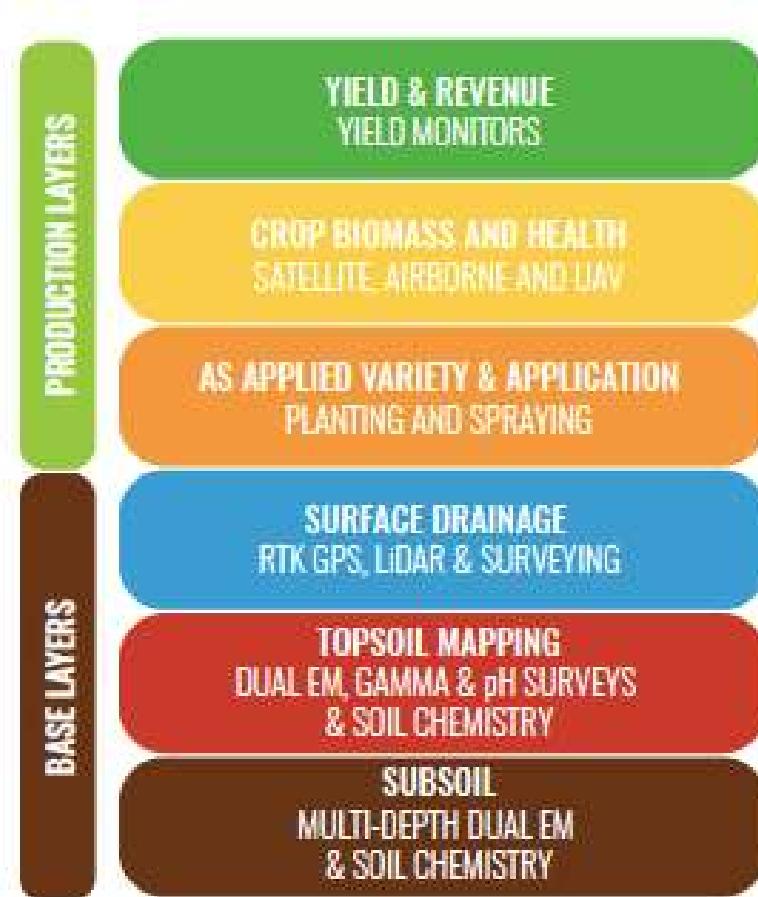
Tree performance monitoring

- Asset monitoring
 - Combination of RGB and multispectral imagery
 - Create polygons around each tree, embed tree statistics like
 - Variety, plant date, seasonal VI value, crown diameter
 - and report tree statistics spatially



PA Planning

- Do a soil survey EM.
- Sample strategically for physical properties. Include Sand Silt Clay.
- Calibrate EM to WHC and PAW if you can.
- Use soil and elevation surveys to build initial 9 zones.
- Zone base is clay content v water shed, neutral and accumulation.
- Start overlaying production data like NDVI and yield to see responses.
- Introduce testing strips to understand the impact of nutrients.
- But if you don't make an effort to follow through it will fail.




Q & A's



THANK YOU



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