



## WHAT IS YIELD MAPPING

Yield mapping refers to the process of collecting GPS data on crop yield and characteristics, such as moisture content, while the crop is being harvested. Various methods, using a range of sensors, have been developed for mapping crop yields.

The basic components of a yield mapping system include:

- Grain flow sensor - determines grain volume harvested
- Grain moisture sensor - compensates for grain moisture variability
- Clean grain elevator speed sensor - used by some mapping systems to improve accuracy of grain flow measurements
- GPS antenna - receives satellite signal
- Yield monitor display with a GPS receiver (to geo-reference and record data)
- Header position sensor - distinguishes measurements logged during turns
- Travel speed sensor - determines the distance the combine travels during a certain logging interval. Engine performance data can also be recorded in some systems.

### HOW WE DO IT AT VANTAGE NZ:

At Vantage NZ we process the data collected, utilizing the farmer's knowledge to remove all known anomalies in the captured yield data, and then calibrate this data to actual yield quantities.

We process the data using the latest in Precision Agriculture software and upload it to a server for you, the customer, to download onto a desktop software package.

This software allows the farmer to view all yield maps for the farm, normalise them between crops and season, create enterprise maps showing areas of profit and loss and create variable rate application maps. Other crop sensor, soil nutrient variability and satellite imagery can also be integrated.

Additionally, for those that want to do it all, we also have a Trimble's Farm Works software package that is a farm recording and mapping program in one to keep track of your inputs as well as import all your harvest data.

It is widely accepted that yield mapping is the most integral place to start in any precision farming operation, as all precision farming practices come down to deciding on the most economic input for a given area, thus yield needs to be known so the result is measurable.

### YIELD MAPPING USES:

Yield maps can be used for a variety of reasons, however all uses require quality yield data. Some of the uses of yield data are as follows:

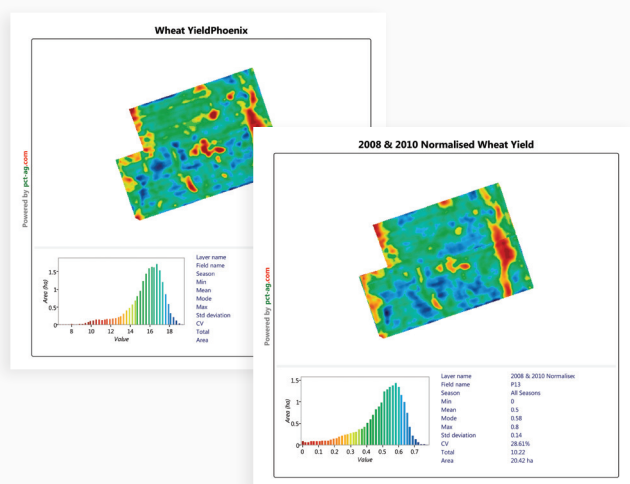
- Define consistent management zones using multiple years of yield data normalised together
- Create gross and net profit maps for learning how to fine tune inputs to maximise profitability in all areas of the field. Identify yield limiting factors and assess how much loss these are causing – allowing justification for eliminating or reducing the effect of these factors
- Calculating nutrients removed from the soil and thus the amount that needs to be replaced in these areas – particularly for base fertiliser
- For comparisons and on farm trials of different inputs, rates or management systems to see if their effects carry through to a yield effect. Costs vs. additional income can also be mapped from different trials across a field.
- Other costs can also be compared and mapped depending on your systems setup, such as fuel performance, work rates



## NORMALISING YIELD MAPS:

Normalising is the process of calculating the ratio of the actual yield to the field average at each point in the field. Normalising is an essential step in defining areas with potentially high and low yields.

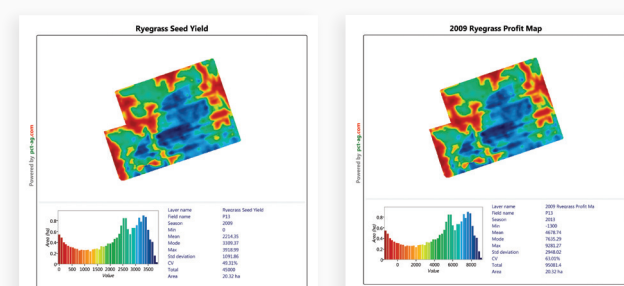
When normalising factors such as different crop varieties, irrigated and dryland, different seasonal climates should be taken into account and these normalised separately with the resulting relative yields recombined into one data file for the whole field. In the normalised map below the areas values greater than 0.5 are consistently better areas of the field while areas that are less than 0.5 are consistently poor yielding in comparison.



## ENTERPRISE MAPS:

An enterprise summary can be easily calculated by subtracting flat rate expenses and variable rate expenses across a paddock from the gross profit maps as calculated by the yield map and multiplied by the commodity price. The resulting map can then be broken into different intervals to assess what are the most and least profitable areas of a field.

After creating an enterprise map it can be seen that areas of the field will be making a net profit, while some areas of the field maybe making a net loss. These areas of net loss are the key areas to focus on initially and bring back up to a break-even level through targeted management of inputs and eliminating or reducing the yield limiting factor, through management zones.



Above the (Net) Profit Map shows that while the average net profit of the field is good (\$4678/ha) there is still a considerable range with some areas of the field losing up to \$1300/ha.

## SUMMARY

- Yield maps are one of the most valuable sources of spatial data for precision agriculture
- A long yield history is essential to avoid drawing conclusions that are affected by the weather or other unpredictable factors during a particular year.
- It is essential to remove the data points that do not accurately represent the yield at a corresponding location.

- Processed yield maps can be used to investigate factors affecting the yield or to prescribe variable rate applications of agricultural inputs according to zones of differing yield potential.
- All the above helps to drive your business forward providing answers (from good spatial data) to different approaches you trial, but be warned it can and will also raise new questions! All of which makes your business more efficient in the long term.

### For more information, contact:

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