

# Mapping variation at harvest

## yield monitors on carrot harvesters

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**C**enter West is now able to map carrot yield to identify and quantify the extent of spatial variability in their carrot crops.

The yield monitor logs real time carrot data to a server and data can then be downloaded and processed into yield maps. Figure 2 highlights some of these yield maps.

This yield data and maps can be used to determine: which areas are underperforming, the degree of variability contributing to the underperforming areas and a potential profit/loss map.

**A key element of this project is demonstrating what precision technologies are commercially available to assist in horticulture with identifying and understanding crop variability.**

Yield monitoring is one such method that provides a real-time measure of variability in the field at harvest and has been received well by the growers involved with this project as a tool for their production operations and agronomy.

While yield data can provide some information on where yield is variable, additional surveys of the field will be required to determine underlying causes or areas of limitation, such as nutrient deficiency or moisture stress.

Methods to assess variability in the field prior to harvest include:

- EM38 mapping, which measures the apparent electrical conductivity in the soil, indicating differences in soil texture and salt levels. This is done when the field is under bare fallow.
- Strategic soil and plant sampling
- Crop sensing imagery for biomass can be used to assess variability in crop and over subsequent crops where carrots are part of a longer rotation.



**FIGURE 1** Left: The yield monitor control unit in the tractor cab. Right: The 4-row ASA-lift carrot harvester at Center West, WA to which a yield monitor is fitted  
 (Source: Allan McKay, 2018)



**FIGURE 2** Preliminary yield maps of recently harvested areas on Center West properties, WA. The red areas in the fields show lower yielding zones and green/blue areas show higher yielding zones

Source: Advanced Technology Viticulture, 2018

Yield monitor installation at Center West was part of the national project 'Adoption of precision systems technologies in vegetable production' (VG16009).

This unit is one of a suite of yield monitors on carrot harvesters across Australia with units also installed at sites in South Australia, and Tasmania and a pre-existing monitor in south east Queensland.

The yield monitors were supplied and installed by Bernd Klientagel of Advance Technology Viticulture, based in South Australia. The unit consists of a load-cell fitted to the unloading elevator on the harvester, a control and data recording WiFi capable GPS unit in the tractor cab and a wireless router for data transmission.

**MORE INFORMATION ►**

For further information on this project, please contact:

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**This project:**

The Horticulture Innovation Australia funded project **Adoption of precision systems technology in vegetable production (VG16009)**, led by the Queensland Department of Agriculture and Fisheries (QDAF), commenced in early 2017.

The aim of the project is to support the vegetable industry with the adoption of precision agriculture technologies. The project will develop case study farms in each state for research and extension, to showcase the potential applications of relevant precision technologies.

The project has a number of collaborators across Australia including the University of New England (UNE), Tasmanian Institute of Agriculture (TIA), Harvest Moon, Primary Industries

and Regions SA, vegetablesWA and the Society of Precision Agriculture Australia (SPAA). **The key areas of investigation centre on the following questions:**

- Is there farm/block variability?
- Is the observed/quantified variation having an economic impact?
- Can this variability be understood and managed?
- Are current management practices/equipment suitable for addressing any variation?
- Will a precision approach elicit a yield/quality response?
- What is the return on investment?