National Vegetable Extension Network
VICTORIA - GIPPSLAND

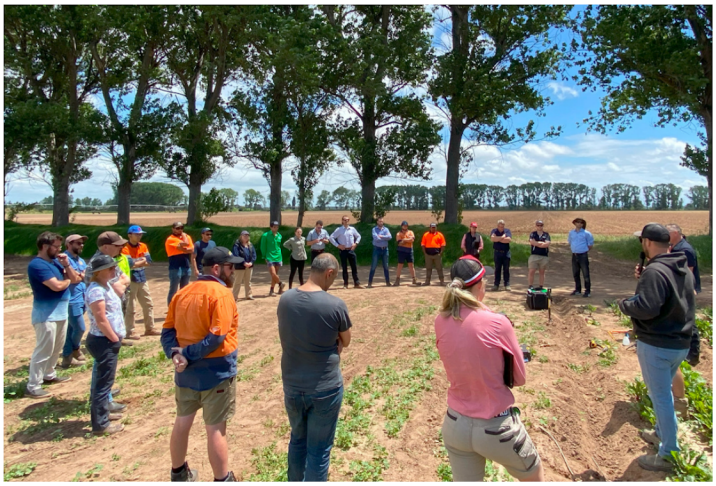
December 2023

The practicalities of soil data monitoring in intensive vegetable production

Introduction

Soil data monitoring technology can see a vegetable farm improve its water use efficiency and farm practices by measuring the moisture and salinity levels throughout the soil profile. This provides information on the saturation point, root depth, soil composition and potentially even provide an indication on nutrient levels within the soil profile. While all this data sounds fantastic on a glossy brochure, what are the realistic benefits and challenges of using the technology in intensive vegetable production?

VegNET Gippsland, through Food & Fibre Gippsland's ongoing funding from the Commonwealth Government's Future Drought Fund through a "Hub-Hub" project – a collaboration between the Victorian, WA and NT Drought Resilience Hubs – hosted a soil moisture monitoring field day in late November 2023. The field day aligned strongly with VegNET Gippsland's water quality and security and smarter growing focus areas and saw a successful collaboration between VegNET Gippsland, Elders Bairnsdale, Agriculture Victoria and Sentek Technologies. The field day focused on providing the 25 attendees with the opportunity to learn about the practicalities of adopting soil data monitoring technology in intensive vegetable production.



Participants at the VegNET Gippsland Soil Moisture Monitoring Field Day in November 2023.

Tailored event

The field day consisted of three key components – a technical presentation, networking lunch, and field demonstration. Medi Zaboli and Marc Intervera from Sentek Technologies led a technical discussion on soil data probes and how they work, including how growers can utilise the data interface; integration of additional technologies such as weather stations; and how to interpret the data to inform decision-making. Lunch and a networking session were then provided to allow attendees to have individual conversations with the presenters and other attendees.

Noel Jansz and Hugh McShane, agronomists from Elders Bairnsdale, led a field demonstration on the installation and removal of a probe and provided growers with an

KEY MESSAGES

- **The field day provided growers with the opportunity to learn about the practicalities of adopting soil data monitoring technology in intensive vegetable production.**
- **The agronomists and growers who have been trialling the soil data monitoring technology for the last two years believe that while there are challenges associated with its use, the benefits out-way the challenges.**
- **Growers have changed farming practices following the integration of soil data monitoring technology into their farming operations, and have seen an increase in the consistency of crop yield and quality.**

Hort Innovation VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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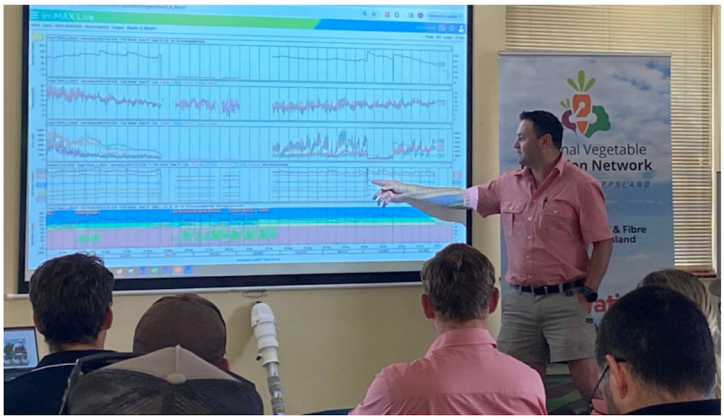
agronomist's perspective on the technology. Noel was also joined by several Gippsland growers who have been trialling the technology in intensive vegetable production for over two years as part of a larger project, to answer questions from a grower's perspective.



Elders agronomist Noel Jansz pointing out key features in a soil moisture graph.

The practicalities

Feedback from the event showed that 40% of growers reported owning probes although not really using them, suggesting that there are barriers to the use of soil data monitoring technologies. Time, probe installation/removal, smartphone interface, and technical and agronomy support were some of the key barriers raised by growers at the field day.

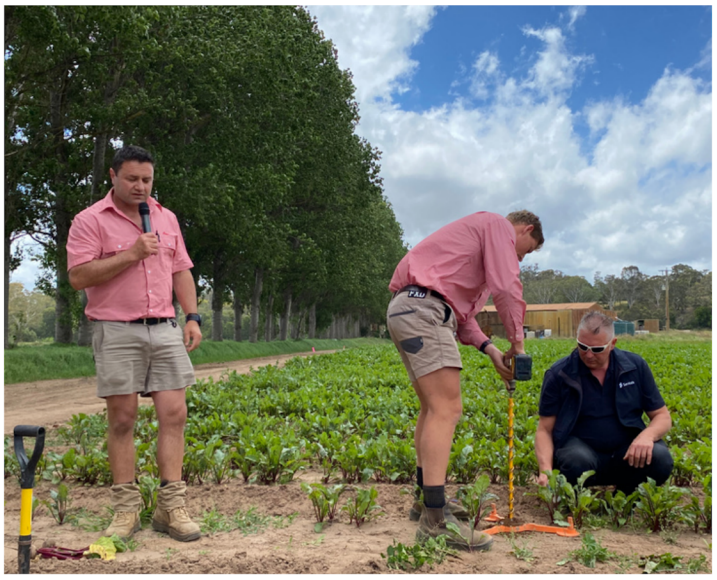
It should come as no surprise that time is one of the primary barriers to the continued use of soil data monitoring technology in intensive vegetable production. With growers under constant time pressures, there is minimal spare time in the day to be sitting in front of a computer analysing detailed soil monitoring data. With substantial amounts of data available from a probe, the time required to fully analyse and understand the information can be quite significant.

Support from an experienced agronomist to analyse and interpret the data can help to relieve the time burden, however it can also add an additional cost to the use of the technology. The time input required is particularly significant for growers new to the technology, with it potentially taking over a year to confidently integrate the technology into an intensive vegetable production system. An element of self-discipline also exists, with growers only getting out as much as they are willing, or able, to put in.

Time also comes into the play with respect to the movement of probes from crop to crop and the associated installation and removal processes. This is particularly relevant for baby leaf growers, where the short growth cycle of the crops means that probes are constantly being removed, moved and re-installed. Despite this, one grower who has been using the technology for over two years commented that he was surprised at how useful he found a probe located in a spinach crop to be.

Multiple attendees noted that a key learning they took from the field day was the importance of taking the time to install the probe correctly, including the use of the baseplate, as incorrect installation can cause the probe to display inaccurate soil moisture readings. Challenges were also noted in the installation of probes in some soil types, with the risk of air pockets impacting readings, as well as topography limiting the value of the data.

A challenge that was actively discussed by attendees at the field day was the usability of a probe's smartphone interface while out in crops. A consequence of growers' lack of time and the nature of farming, is that growers are rarely in front of a computer with large monitors; rather, they are in the field with only a smartphone to access the probe data.



Elders agronomists Noel Jansz and Hugh McShane, along with Marc Intervera from Sentek Technologies, demonstrate the installation of a soil data monitoring probe.

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The field day was a collaboration between Sentek Technologies, Elders Bairnsdale, Agriculture Victoria, VegNET Gippsland and local Gippsland growers.

The benefits

Many growers noted that one of the key learnings they took away from the event was that soil data monitoring can be used to make more improved irrigation decisions to ensure crops have adequate moisture throughout all growth stages. It's important to note, however, that the adoption of this technology is not about replacing current methods of irrigation scheduling; it is about improving a grower's understanding of the interaction between plant, water, and soil.

The field day demonstrated that the benefits of using soil data monitoring technology can be broader than simply increasing irrigation and water use efficiencies. One attendee noted that they see the probes as a "tool to assist [in] gaining a more in-depth knowledge about how crops are growing - beyond just irrigation." From information on moisture and fertiliser movement through the soil profile, to the integration of satellite imagery and weather data, and an understanding of root zone depth, the benefits of the technology are broad-reaching. One of the project's growers confirmed that over the two years they have been trialling the technology, it has triggered them to review and modify their farming practice to help improve infiltration rates and led to an increase in the consistency of crop yield and quality.

The technical session demonstrated to growers how far the technology has come in recent years, with increased data outputs, integration of both satellite and weather station data and multiple ways to view, compare and analyse the multitude of data sets available through the technology.

Conclusions

It was clear throughout the field day that the agronomists and growers who have been trialling soil data monitoring technology for the last two years believe that while there are challenges associated with the use of the technology in intensive vegetable production, the benefits outweigh the challenges. Walter Chadwick from Tripod Farmers stated during the field day that he has changed and improved farming practices following the integration of soil data monitoring technology into his farming operations. This was echoed in the feedback from other attendees, with 90% of the growers who completed the feedback stating that they would likely change farm practices or advice following the event. Qualitative feedback also showed that there was a 70% increase in attendees' knowledge and skills associated with soil data monitoring technology following the event.

Next steps

It is hoped that Food & Fibre Gippsland's ongoing funding from the Commonwealth Government's Future Drought Fund will see the successful collaboration between VegNET Gippsland, Elders Bairnsdale, Agriculture Victoria, Sentek Technologies and Gippsland growers continue into 2024. VegNET Gippsland is also looking to deliver additional events and information to support growers to adopt soil data monitoring technologies across the region. To keep up to date with all VegNET Gippsland events, follow 'VegNET_Gippsland' on Facebook and Instagram.

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With thanks to Noel Jansz, Walter Chadwick, Kane Busch and Scott Botten.