



HINKLER AGTECH INITIATIVE

Aerial Mapping of Tree Crop Status

INTRODUCTION

This trial was undertaken as part of CQUniversity's Hinkler AgTech Initiative. The Initiative aimed to increase the productivity and profitability of the Bundaberg region's agricultural sector through greater availability and utilisation of agricultural technology (AgTech). An extensive consultative process undertaken with agribusinesses identified on-farm needs that may be addressed using AgTech. Trials of selected AgTech products and services were then undertaken in partnership with agribusinesses and technology providers to determine the technologies' efficacy in on-farm conditions. This summary provides an overview of findings from one of the technology trials, including grower feedback and considerations for other growers when deciding whether to utilise the technology in their own enterprise.

Background

The number and extent of tree crops are expanding rapidly throughout Australia. As orchard sizes increase, it becomes more challenging for growers to monitor their crop and identify areas that require attention. Traditionally, growers monitor their orchards by physical inspection, often while performing other tasks such as spraying, slashing or picking. However, this process runs the risk of not identifying issues in time to address them appropriately. In an increasingly competitive and consumer-driven environment, it is critical for growers to identify issues such as tree water status and crop fruit load as soon as possible to ensure optimum crop quality and productivity. Growers are turning to technologies that can quickly and easily collect crop data and provide insights that assist with making well-informed and timely management decisions.

The Technology

Aerobotics' technology uses multispectral and thermal imagery, taken from an aerial drone, to deliver a range of tree crop data offering actionable insights down to the individual tree level. Aerobotics offers irrigation insights, including the assessment of water stress in individual trees through temperature, or transpiration, to assist growers with

optimising and maintaining their irrigation systems. This data allows growers to identify blocked and leaking irrigation throughout their orchards, as well as locating pressure issues within their systems before visible damage occurs to trees.

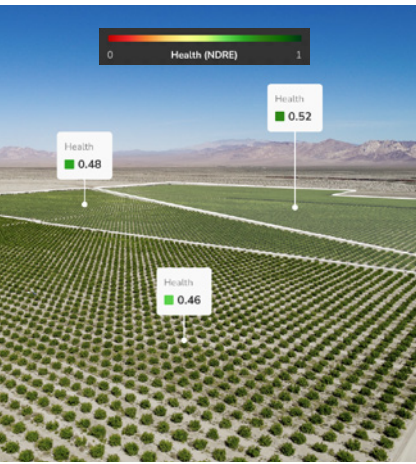
The Trial

A local drone pilot was engaged through Aerobotics to deliver drone flights for four separate crops of macadamias and avocados. Data was uploaded to the Aerobotics platform for processing and analysis. Aerobotics provided the growers with postflight reports from each drone flight, as well as training and technical support for the use of the interactive platform for the duration of the trial period.

RESULTS

Through multiple rounds of ground truthing assessments made after each drone flight, good relationships were found between areas of high transpiration and soil moisture. Fruit size was also measured for the avocado crops, which also showed strong relationships between transpiration, soil moisture and fruit size distribution, with higher transpiration linked to larger, more uniformly sized fruit.





The reports supplied to growers post drone flights also identified a range of irrigation issues, some of which were addressable through irrigation system maintenance. Other insights provided growers with previously unknown information about their crops and water management on their farm, such as the impact of large bodies of water on nearby tree health. Growers were also able to use the interactive ‘AeroView’ platform to scout their orchards for other production issues, such as pest damage and tree maintenance, allowing them to record, track and GPS-mark issues over their season. The platform also allowed growers to establish and assign pre-determined scouting routes for their staff to ensure scouting was performed regularly and in appropriate areas of the farm.

Value to Business

The cost to deploy the Aerobotics system (including mapping and analysis) ranges from \$25-\$45/ha per flight*, depending on the covered area and overall number of flights required. Growers reported that having a drone capture large amounts of data and display insights on the AeroView platform was a valuable resource for crop and irrigation management on a much larger scale than they previously were able to accomplish. Manual methods of crop scouting were time consuming and often missed problems in the early stages, and instead identified problems only when the trees began to show visible symptoms. Having the drone flights completed three times over their cropping season also allowed growers to monitor their crop throughout development. Growers also reported that the platform was easy to use and useful for other farm management operations, as the system provided them with detailed and interactive farm maps and in some instances, irrigation overlays and maps.

Grower Feedback

Trial Summary Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I see value in this technology				✓	
I found the technology easy to use					✓
The technology was easy to integrate within my business				✓	
I was satisfied with the service provided by the AgTech company					✓
I intend using this technology in my business			✓		
I recommend this technology to other growers			✓		

Other Considerations

Like all drone-based technology, there is a need to balance timely data collection and appropriate weather conditions, both for safe flight operation and for image and data quality. At the time of these trials the Bundaberg region saw unprecedented amounts of rain and cloud cover, which resulted in many of the drone flights and data collection being delayed. Additionally, because of the large volume of rain preceding some of the drone flights, relationships between soil moisture, transpiration and irrigation was difficult to ascertain given many growers were not irrigating at the time.

Another consideration is the use of the data. While insights generated are useful for farm management, it requires an amount of grower investment to follow up and address the issues identified. The nature of this kind of tree data is such that it is most powerful, and provides most value for money, if it can be acted upon in a timely and appropriate manner by the grower.

Further Information



For further information on this trial and results, email CQUniversity’s agricultural research team: agriculture@cqu.edu.au

For further information on ‘Aerobotics’ products and services: aerobotics.com

Summaries of other technology trials undertaken through the Hinkler AgTech Initiative are available at: bundabergagtechhub.com.au

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