



HINKLER AGTECH INITIATIVE

On-farm Connectivity Technology

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 lack of dependable on-farm connectivity is an ongoing challenge for much of regional Australia. Inadequate internet coverage means that farmers are often unable to access valuable information and services, and this limits their ability to make informed decisions. The slow speed of internet services in rural areas can also hinder farmers' ability to use online tools and platforms for communication, marketing and sales, as well as monitoring crop development and animal health. For many farmers, establishing reliable on-farm connectivity is an important first step in incorporating agricultural technology (AgTech) into their operations.

The Technology

Zetifi offers a suite of Wi-Fi products designed to work together in scalable systems, ranging from single point/vehicle cells to whole-of-farm connectivity. Together, the systems eliminate communication 'dead spots' by extending the reach of existing mobile phone and satellite networks. Zetifi's systems are based on a combination of fixed (ZetiCell) and mobile (ZetiRover) Wi-Fi cells. A ZetiCell is usually installed on top of a building, or as a standalone solar-powered unit in a remote work site and can provide coverage to phones hundreds of metres away or to ZetiRover cells up to 3km away. The ZetiCell maximises the reliability of the internet connection and Wi-Fi by using proprietary multi-carrier technology to combine a primary connection with a backup data connection into a robust Wi-Fi network. All devices are fitted with powerful long-range antennas that broadcast the resulting Wi-Fi to where it is needed. ZetiRover is a mobile hotspot cell that can be fixed to farm vehicles

or machinery and converts patchy coverage into Wi-Fi signals. The ZetiRover may provide access to the landholder's WiFi base station (when unobstructed by trees/structures) or it may provide access to the Telstra/Optus networks when out of range of the base station.

The Trial

A suite of Zetifi Wi-Fi products were installed at an avocado and macadamia farm near Bucca, north of Bundaberg, where poor connectivity has been an ongoing challenge for business operations. The trialed system included the following components:

- **ZetiCell base station** - A ZetiCell base station was installed on a 4.4m mast and long-range antennas installed on the roof of an office building. The ZetiCell uses multi-carrier technology to maximise the reliability of the internet connection. The aim of this base station is to provide a main internet connection and to broadcast Wi-Fi within an outdoor (uninterrupted) range of 300m. A WAP (Wireless Application Protocol) was installed in the roof cavity to provide indoor Wi-Fi.
- **ZetiAP devices** - ZetiAP devices were installed in the roof cavities of three buildings around the property. These devices connect to the ZetiCell to provide indoor Wi-Fi. Additional ZetiAP devices were installed at three pump sheds, to establish point-to-point Wi-Fi connections.
- **ZetiRover** - A vehicle-mounted ZetiRover was also installed for this trial with the aim of providing whole-property coverage.

The results from this trial demonstrate a service which can help to improve internet access in remote locations. However, in areas of high-density crops, connectivity may require a combination of services to access or improve coverage. These may include long range wide area network (LoRaWAN) , satellite NB-IoT or Starlink to assist growers in achieving effective on-farm connectivity and being able to deploy AgTech products and services.

Growers should also consider the types of AgTech products or services they are likely to adopt in future, as some connectivity solutions are more appropriate for particular kinds of technology such as robotics and autonomous vehicles.

Results

Following installation of the Zetifi system, the growers reported notable improvements in internet coverage, particularly around office and building areas. Management and staff are now able to communicate reliably via web-based communication applications, such as 'WhatsApp'. The growers also noted the excellent service provided by Zetifi, with minor teething issues being quickly addressed through consultation and appropriate modifications.

Weak internet connection remains an issue in several spots on the farm where orchards or other structures block the WiFi signals. The growers also commented that the system did not allow for automatic reconnection when moving between connectivity areas, requiring them to manually switch between hotspots. The ZetiAP devices installed on the pump sheds drew a significant amount of power, requiring the addition of solar panels.

Despite these small issues, the growers described the overall installation as a 'game changer' with resulting communication improvements deemed valuable not only for business operations, but also for the safety and wellbeing of staff.

Value to Business

The Zetifi system provided improved internet access, particularly around buildings, in a remote location where connectivity is unreliable and problematic. This improvement in connectivity helped to improve efficiency and will assist the growers with deployment of other AgTech products and services. For example, drone image data can be uploaded and analysed in a timeframe that allows this data to be related to ground-truthing (crop measurement) data.

The capital cost of the Zetifi system in this trial, including installation and set-up, was approximately \$15,000*. An additional \$5000* was spent on solar panels to boost power supply to the ZetiAP units on the pump shed. The costs of installing and setting up a Zetifi system for any particular property will depend on its layout and features, including topography, infrastructure and tree cover. In addition to these establishment costs, ongoing subscription costs to access the Zetifi system are approximately \$150/month*.

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

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Growers should also consider the types of AgTech products or services they are likely to adopt in future, as some connectivity solutions are more appropriate for particular kinds of technology such as robotics and autonomous vehicles.

Further Information



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

For further details on Zetifi and other services provided by the company, visit: zetifi.com

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

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