

# On-Farm Connectivity Technology

BY ZETIFI



## HINKLER AGTECH INITIATIVE

A CASE STUDY BY CENTRAL QUEENSLAND UNIVERSITY





*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 case study 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.*



**HINKLER  
AGTECH  
INITIATIVE**

## Introduction

Australian agriculture is seeing a rapid emergence of new technologies that are changing traditional farming practices. Agricultural technology (AgTech) promises improved productivity and yield and the ability for growers to make better decisions, but the rate of uptake of AgTech remains impeded by several factors. These factors include a lack of awareness by growers of potential technology solutions, difficulty in evaluating the on-farm efficacy of technology and a gap between grower needs and technology developments.

The aim of this summary is to assist growers by providing

background information on commercially available technology, including details of its performance and value proven through on-farm trials.

Zetifi’s technology eliminates communication and connectivity ‘dead spots’ in remote locations by extending the reach of existing networks. The technology consists of both fixed and mobile devices that enable farmers to communicate from remote points on their property. Zetifi operates from Wagga Wagga, Australia and since its inception in 2017, has expanded to support a network of national and international outlets.



FIGURE 1: A mobile ZetiRover Installation



FIGURE 2: Zetifi on Farm

## What Does the Technology Deliver?

Zetifi's technology delivers reliable communication and connectivity to areas where mobile phone coverage and internet connection are currently unreliable or unavailable. Their fixed and mobile hardware enable farmers to communicate with work staff, access valuable information in real time and engage with suppliers and customers from remote areas on their farms and farm vehicles. The technology can also be used to support other systems connected to the internet, including monitoring networks, weather stations and farm management software.

A complete Zetifi system can also be configured to provide multiple access and broadcast points across a farm, which helps to distribute the load across the network and improve the overall performance and speed of the property's existing network.

Better connectivity empowers farmers to make better, data-driven decisions and adapt more readily to changing conditions, ultimately enhancing the productivity and profitability of their operations.

## How Does the Technology Work?

Zetifi's systems are based on Wi-Fi technology that uses wireless radio waves to transmit data and voice between devices. The technology bolsters and extends a property's existing 4G or satellite network by improving its range, speed and reliability.

Zetifi's hardware includes both fixed (ZetiCell) and mobile (ZetiRover) Wi-Fi transmitters / receivers. A 'ZetiCell' is permanently installed on top of a house or shed and connected to mains power. At sites where mains power is not available, a Zeticell can be powered by solar power, through a configuration supplied by Zetifi. The ZetiCell uses a property's existing 4G or satellite connection and combines

it with its own 4G connection to transmit Wi-Fi signals up to 300m to devices within line of sight.

Where required, a Zetifi system may also incorporate one or more mobile Wi-Fi transmitter / receivers known as 'ZetiRovers'. A ZetiRover can be attached to a farm vehicle and is also able to transmit Wi-Fi signals up to 300m to devices within line of sight, enabling connectivity both in and out of a vehicle.

When used together, a Zeticell is capable of transmitting Wi-Fi signals up to 3km to a receiving ZetiRover.

FIGURE 3:  
Zetifi Technology  
Includes Fixed  
and Mobile Hardware





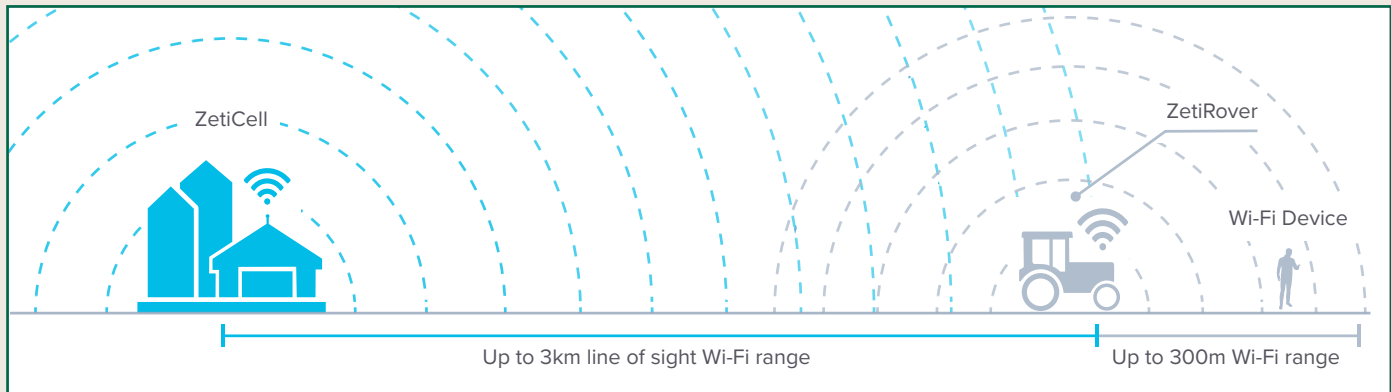


FIGURE 4: Zetifi Coverages With Clear Lines of Sight

## What is Required from the Grower?

Growers wishing to deploy a Zetifi system on their property are encouraged to discuss their specific needs directly with the Zetifi team early in the planning phase, to ensure that the final system configuration meets their needs.

The cost of installing a Zetifi system will depend on the size and complexity of the installation, the number of access points required, and any additional hardware or services needed to provide the required coverage. The total cost of a system incorporates an upfront purchase of any required hardware and an ongoing monthly subscription to a ZetiRoam access plan, as detailed below.

Growers can either manage their own assembly and installation of system components or engage an electrical contractor to undertake this work. Installation usually takes approximately 4 hours. Access will usually need to be given to one or more elevated points (e.g., The roof of a house or shed) to mount fixed components such as the ZetiCell and associated antennas and power packs. Solar panels and fencing may need to be installed at a dedicated site, where a standalone solar-powered cell is required.



FIGURE 5: A Solar Powered ZetiCell Installation

HARDWARE	
ITEM	COST (\$)
<b>ZetiCell unit only (Fixed)</b>	1,600
<b>ZetiCell ‘mains power’ installation kit</b> (including cabling, antennas, controllers and brackets for connection to mains power)	800
<b>ZetiCell ‘solar power’ installation kit</b> (including cabling, solar panel, controllers and fittings for stand-alone solar connection)	5,000
<b>ZetiRover unit only (mobile)</b>	1,600
<b>Portable external 4G antenna</b> (magnetic mount, stationary use only)	85
<b>On-farm dual antenna pack</b> (magnetic mount, on-farm use only)	340
<b>Permanently mounted vehicle bar mount with LTE antenna</b>	380
<b>Permanently mounted folding dual antenna pack for vehicle</b>	580

ZETIROAM SUBSCRIPTIONS*	
PLAN	COST (\$/MONTH)
<b>ZetiRoam BYO</b> (customer-supplied primary SIM card with 10GB backup data from Zetifi)	30
<b>ZetiRoam 10</b> (10Gb of roaming multi-carrier data)	60
<b>ZetiRoam 20</b> (20Gb of roaming multi-carrier data)	90

(\*There are no lock-in contracts with any of Zetifi’s services and if any product does not meet your expectations of better coverage and reliability with the first 60 days, you can return it for a full refund)

## What is Required from the Grower?

A grower may also need to attach mobile transmitters, including small antennas, to their quad bike, utility or tractor. This can be done using one of the specialised mounting configurations provided by Zetifi. The system's 'plug and play' mode enables growers to quickly move these transmitters between farm machinery and off-farm passenger vehicles as required.

Once the hardware has been installed, growers will need to access Zetifi's 'plug and play' setup software, that enables connection between all the devices and to the selected 4G or satellite network. No specialised networking expertise is required to install and operate this system.



FIGURE 6: A Solar Powered ZetiCell Installation

FIGURE 7: Removable ZetiRover Unit



## Technology Provider

Zetifi was founded in 2017 to address connectivity challenges faced by farmers and residents in rural and remote Australia.

Following a successful series of pilot studies and on-farm trials throughout NSW, the company now boasts a 20-strong workforce of network engineers, software developers and production staff based in its own manufacturing facility at Wagga Wagga, Australia. Zetifi also has satellite offices in Sydney, Melbourne and Rochester, New York.

Given that Zetifi's technology can be installed by qualified electricians and no training is required for system set-up, Zetifi does not maintain a national service network but provides online assistance and advice to customers.

## Applications of Technology (Current and Potential)

Zetifi's technology will work anywhere if it is configured with a satellite internet connection. If the system is to be connected to the 4G network, then Zetifi will perform a service check when the customer places their order. Zetifi can provide a good connection as far as 60km from the nearest tower depending on line-of-sight and other local factors.

A trial conducted by Zetifi, through the Central Queensland University's Hinkler AgTech Initiative, assessed the efficacy of their technology on a commercial avocado and macadamia orchard in Bundaberg. The trialed technology included a fixed ZetiCell at the homesite, roaming ZetiRovers fitted to farm vehicles and a solar-powered ZetiCell at the rear of the property.

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 line-of-sight between 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 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.

The ZetiRover unit is deployed on its own by agricultural service providers whose work requires problem solving and access to a suite of online sources in the paddock. For example, many agronomists rely on cloud-based farm management platforms to record and communicate their recommendations to clients. The greater connectivity

provided by the ZetiRover extends the range, speed and reliability of data transfer from these platforms.

The ZetiRover can also be installed in smart tractors and associated equipment to enable the transfer and processing of data in the paddock rather than returning to an office or workshop. SwarmFarm Robotics trialed a ZetiRover on a SwarmBot that was guiding a 12m wide autonomous sprayer on the Darling Downs in Qld. Compared to a sprayer fitted with a standard 4G unit, the ZetiRover unit was far quicker in pulling data down from the cloud and feeding it into the sprayer units. The superior coverage from the ZetiRover also improved the upload speed for coverage maps, meaning that the farmer could see a more accurate coverage map showing where the SwarmBot had been working.

Zetifi is working with Charles Sturt University (CSU) and University of Technology (UTS), Sydney to develop antenna arrays that can be fitted to mobile and stationary farming equipment to provide long-range Wi-Fi connectivity. Tractors and trucks will become roving Wi-Fi devices with a range of up to 5km to provide farm-wide internet coverage. The new technology will be a combination of adapted off-the-shelf and bespoke solutions, including a custom antenna array that is being developed in collaboration with experts from UTS.

After a successful feasibility study in 2021, Zetifi are also delivering a demonstration of its 'ZetiNet' platform in NSW, Australia. ZetiNet is an integrated and scalable public Wi-Fi application of the ZetiCell and ZetiRover products that extends the benefits of Zetifi's technology beyond an individual farm, offering a scalable solution for region-wide connectivity.



FIGURE 8: A Raised ZetiCell Installation

## Value of Technology

Reliable on-farm connectivity provides significant value to farmers across various aspects of their operations, including for example:

- Access to real-time information on weather conditions and market prices
- Greater reliability of precision agriculture such as sensors, drones and other connected devices for monitoring and data analysis
- Remote monitoring and control of irrigation systems and animal health / behaviour
- More reliable communication with field staff, for management and safety purposes.

Another benefit of the ZetiRover is the ability for remote travelers, such as agricultural service providers, to be able to use the unit to connect to online meetings and forums while on the road and not have to dedicate specific 'office days' to attend.

Overall, reliable on-farm connectivity empowers farmers and agricultural service providers with access to information, tools, markets and networks. It enhances productivity, resource management, market opportunities and knowledge sharing, leading to improved profitability, productivity and resilience.

## Additional Considerations

Zetifi's Wi-Fi technology may not be the best solution for every situation and farmers should consider their specific needs, assess all available options and choose the technology that best suits their requirements and resources. Some aspects to consider when assessing your needs include:

- What network connectivity (e.g., mobile phone, broadband) is currently available?
- What do you want to connect (e.g., buildings, equipment, devices, sensors)?
- What power sources exist for the devices you wish to connect?
- Your property's landscape (e.g., flat, undulating, cleared)
- What are the potential ongoing costs beyond installation?

In addition to Wi-Fi technology, on-farm connectivity options also include:

- **Low Power Wide Area Networks (LPWAN)** - include various technologies used to connect IoT devices to a network beyond the reach of traditional networks such as Bluetooth and Wi-Fi. LPWANs are typically used for low data rate transfers making them applicable to many agricultural uses, such as irrigation monitoring networks, where only small packets of data are required.
- **Long Range Wide Area Networks (LoRaWAN)** - are a type of connectivity which uses radio spectrum to enable wireless, wide area communication between minimal powered sensors and gateway connected to the network. A single LoRaWAN gateway installed on a farmhouse roof can service several kilometres of farmland in each direction (depending on topography) and allows a farmer to build their own network without relying on a telco connection.
- **Satellite** – developed to meet the demand for remote connectivity where no other communication infrastructure is available. Satellite connectivity solutions use low earth orbit nanosatellites to provide connectivity from any location on earth without the need for ground-based infrastructure.

## REFERENCES AND INFORMATION SOURCES



For further information on this trial and results, email CQUniversity's agricultural research team:

[agriculture@cqu.edu.au](mailto:agriculture@cqu.edu.au)

Information regarding Zetifi and their products, including pricing, case studies, grower testimonials and contact details, is available at:

[zetifi.com](http://zetifi.com)

A copy of the 'On-Farm Connectivity Guide', jointly published by National Farmers Federation and NBN is available at:

[www.nbnco.com.au/content/dam/nbn/documents/support/regional/on-farm-connectivity-guide.pdf](http://www.nbnco.com.au/content/dam/nbn/documents/support/regional/on-farm-connectivity-guide.pdf)

Summaries of other technology trials undertaken through the Hinkler AgTech Initiative are available at:

[bundabergagtechhub.com.au](http://bundabergagtechhub.com.au)



Australian Government



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