FROM GATE TO GRID

BREAKING DOWN FARM CONNECTIVITY

Regional Tech Hub

What is the Regional Tech Hub?

The Regional Tech Hub is funded by the Australian Government's Better Connectivity Plan to provide free, independent phone and internet advice. This ensures that community members, small businesses and farmers in regional, rural and remote areas have reliable and efficient communication systems, enabling them to stay connected and operate smoothly regardless of their location.

Services we offer

Request a connectivity report
We can help you understand all your phone and internet options for your location.

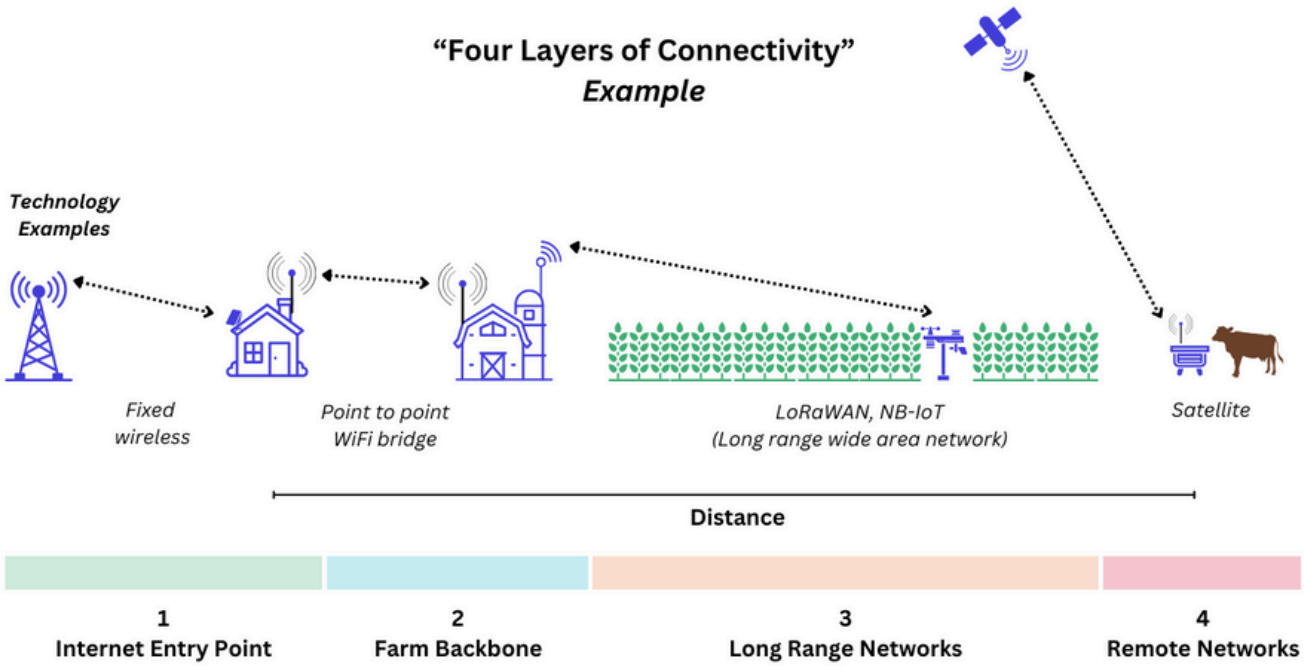
Submit an escalation report
Contacted your provider and the issue still remains unsolved? We can help escalate it.

Contact our 1300 081 029 helpline
A help desk staffed with regional connectivity experts ready to answer your questions.

Connectivity knowledge hub
Online resources to help you understand different technologies, troubleshoot issues and get the most out of your connectivity.

Contents

The Four Layers of Connectivity



The four layers of farm connectivity represent the key stages that enable digital communication across your property. Some properties may use one, some or all of these layers.

- **Layer 1 is your Internet Entry Point:** how your farm connects to the outside world. This could be through satellite, fixed wireless and/or fibre.
- **Layer 2 is the Farm Backbone:** using directional Wi-Fi or mesh systems to spread internet from the house to sheds, yards, workshops, and other key work areas.
- **Layer 3 covers Long-Range Networks:** typically using LPWAN networks (e.g. LoRaWAN) to connect low-power devices like tank monitors across wide areas.
- **Layer 4 is Remote Satellite Networks:** for isolated locations where no other connection reaches. These low-data devices use satellite networks to connect.

Used together, these layers help farmers build a tailored connectivity setup that suits their property size, infrastructure layout, and the way they work - whether that's managing livestock, monitoring water, or improving safety and efficiency.

Layer 1 - Internet Entry Point

"How the internet gets to your house and around the farm."

This is your main internet connection - the way your farm connects to the outside world.

It might come via:

- Satellite (nbn® Sky Muster or Starlink).
- Fixed Wireless (nbn® or Wireless Internet Service Providers - WISPs).
- Fibre (less common, but available in some areas).

This connection usually enters through your house, office, or a central building. But having internet to the house isn't always enough - you also need strong, reliable signal throughout the building.

Many rural homes struggle with poor Wi-Fi indoors due to thick walls, long layouts, or old wiring. That’s why this layer also includes the equipment that spreads signal within the home, such as:

- good-quality Wi-Fi routers placed centrally and if older than 5 years old it is a good idea to replace them.
- mesh Wi-Fi systems to cover large houses or multi-stories.
- Wi-Fi boosters or range extenders for “dead zones” like outside offices.

Getting this layer right ensures your phones, laptops, smart TVs, and even home-based farm apps work reliably - before you even think about sending internet across the paddock.

Layer 2 - Farm Backbone

"From the house to the shed - making sure the signal gets to where you work."

Once the internet arrives at your house or office (Layer 1), the next step is to get it to the places where you actually work. On many farms, sheds, workshops, cattle yards, shearing sheds, or staff quarters are separate from the main house. Without extending your signal, these areas often remain “dead zones.”

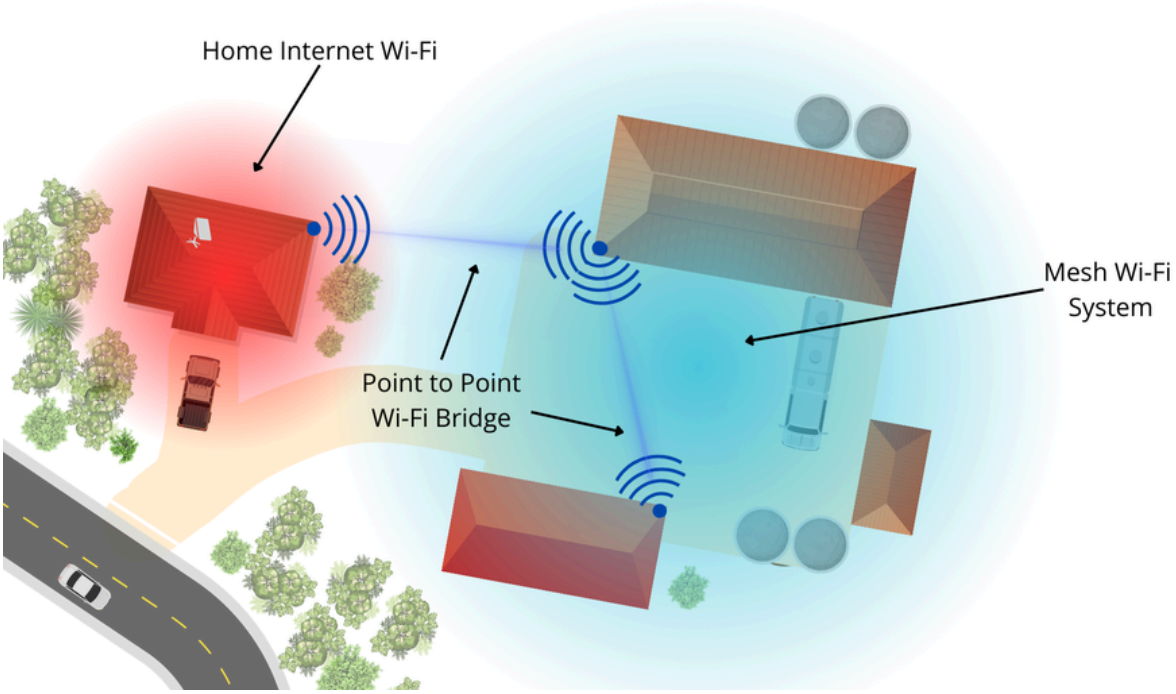
There are a few ways to extend your connection:

Directional Wi-Fi links (point-to-point): These use small antennas to send a strong signal in a straight line from your house to another building. They’re one of the most common and reliable ways to connect sheds and outbuildings.

Mesh Wi-Fi systems: A series of devices placed around the farmstead that work together to create seamless coverage. This is useful for covering multiple smaller buildings close to the house.

Farm Wi-Fi towers or repeaters: For larger areas, some operations install towers that push Wi-Fi over greater distances, creating a broader coverage zone around the house.

Mobile repeaters (CEL-FI): Where 4G/5G mobile coverage exists, these can improve mobile reception and provide internet access in nearby work areas.



Above is an example of Wi-Fi bridges and Mesh systems spreading coverage across a farm.

Extending the signal creates a usable network across the “nerve centres” of your farm operation - the places where staff spend time, equipment is stored, and day-to-day work happens. This makes it possible to use connected tools (tablets, phones, cloud-based software, and even cameras) where they’re most needed.

Layer 3 - Long Range Networks

"For devices that are far away but don't use much data."

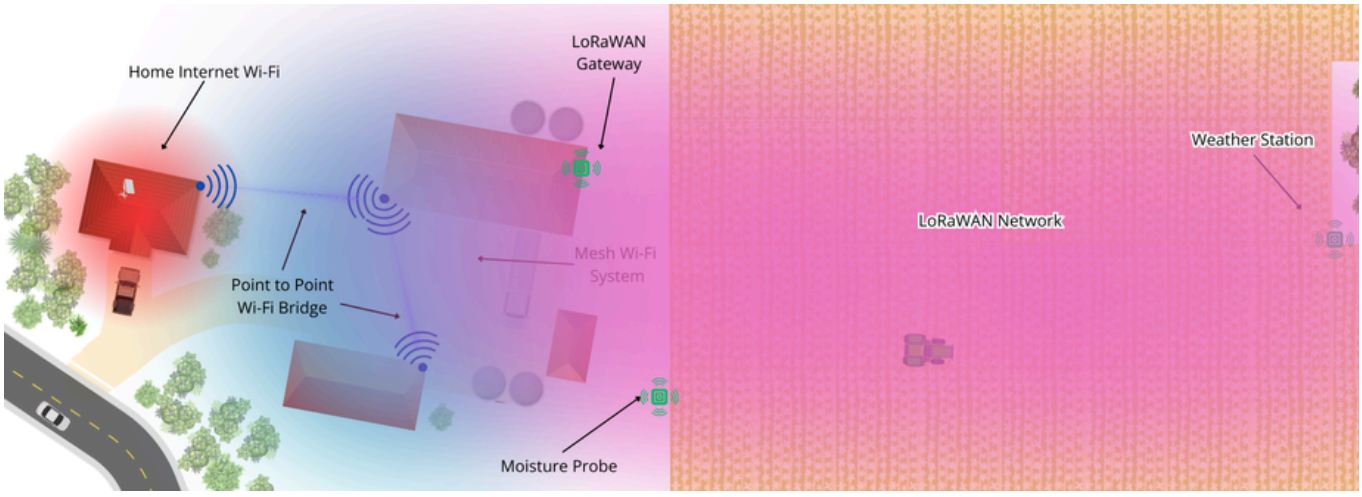
Not every part of a farm needs high-speed internet - but many areas still need to be monitored. This is where long-range, low-power networks come in. The most common type is LPWAN (Low Power Wide Area Network), with LoRaWAN, NB-IOT and Cat-M1 being the most widely used systems in agriculture.

These networks are designed to send small amounts of data over long distances (think kilometres not metres) while using very little power. That makes them ideal for sensors and monitors that need to last months or even years on a single battery.

Common uses include:

- Water monitoring: Tank and trough sensors that send alerts when levels drop.
- Soil probes: Measuring soil moisture, salinity, or temperature in paddocks.
- Weather stations: Collecting on-farm data that's more accurate than regional forecasts.

This layer is about coverage, not speed. It won't let you browse the web or stream video, but it enables smart farming by bringing in data from across the property without needing full Wi-Fi or mobile coverage everywhere.



Above is an example of LoRaWAN network spreading coverage further across a farm.

Layer 4 - Remote Networks

"When you're not in the back paddock - but still want eyes on it."

Even with good Wi-Fi, mesh systems, or long-range farm networks, there are often parts of a property that remain too far away, too rugged, or simply uneconomical to connect using traditional infrastructure. This is where remote satellite networks play a role.

Unlike your main internet satellite (Layer 1), these are low-data, device-level connections. They don't need a house connection or farm gateway - instead, they connect directly to satellites orbiting the Earth.

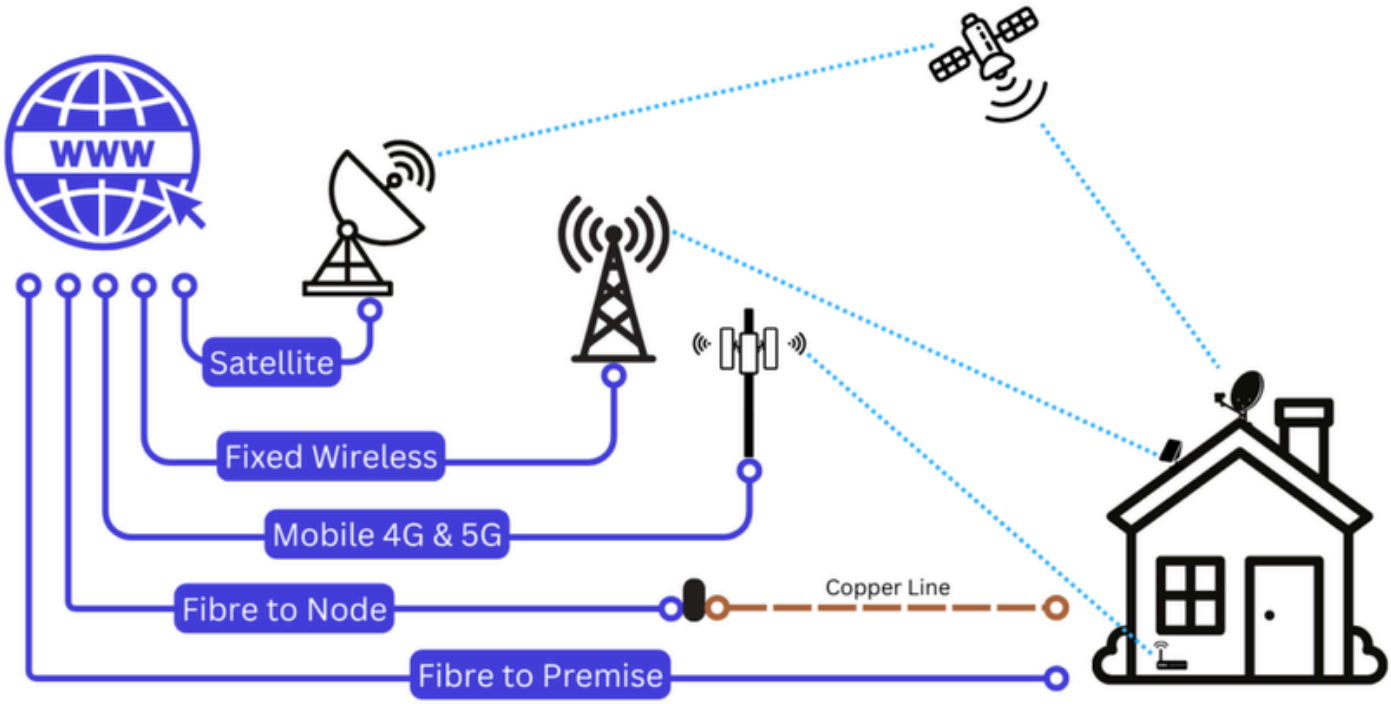
Typical uses include:

- Remote water monitoring: Tank or bore monitors in distant paddocks that can't connect via LoRaWAN.
- Vehicle and machinery tracking: Knowing the location of equipment across large properties.
- Worker safety devices: Personal locator beacons (PLBs), duress alarms, and wearables that send SOS messages from anywhere on the farm, even in blackspots.
- Environmental monitoring: Sensors in remote corners of the property (e.g. for fire risk, pasture growth, or biodiversity monitoring).

Because these systems are often low-bandwidth, they're not suitable for internet browsing or streaming. But they're incredibly reliable for critical tasks - making sure water is flowing, machinery is safe, and workers can raise an alarm in an emergency.

Remote satellite networks are often the final piece of the puzzle in a layered farm connectivity setup, ensuring even the most isolated parts of your property aren't left in the dark.

2: Getting connected



How the internet gets to your farm

In Australia, all farms will have at least two options for connecting to the internet. The National Broadband Network (nbn®) is a major provider and offers 100% coverage of Australia using a range of technologies depending on your location.

In rural or remote areas where fibre may not be available, fixed wireless and satellite services offer viable alternatives. Additionally, some areas have mobile broadband through 4G and rapidly expanding 5G networks, providing flexibility and on-the-go access, particularly useful for mobile or field operations.

Types of internet connections available:

- **Fibre to the Premise** (FTTP) - nbn® or non nbn providers
- **Fibre to the Node** (FFTN)
- **Fixed Wireless** (FW) - nbn® or Wireless Internet Service Providers (WISPs).
- **Satellite** - GEO or LEO providers
- **Mobile Broadband** (4G or 5G) - Telstra, Optus, Vodafone.
- **ADSL** (Limited usage/ phasing out)

Connectivity Terminology

Agtech- any innovation used across the value chain to improve efficiency, productivity, profitability and/or sustainability. It includes hardware and software, business models, new technologies and new applications.

Bandwidth- refers to the throughput (uploads and downloads from a device) of the internet service. I.e. Speed of the connection.

Cel-Fi- a device that repeats an available mobile signal over a larger area. These devices are regulated by the Australian Media and Communications Authority (ACMA).

IoT (Internet of Things) - refers to the interconnection of devices, typically embedding sensors and software, to collect and exchange data.

Latency- a term used to indicate any kind of delay that happens in data communication over a network. Latency is often more noticeable with satellite connections

LPWAN (Low Powered Wide Area Network)- describes a variety of technologies used to connect IoT devices to a network beyond the reach of the traditional networks such as Bluetooth and WiFi.

LoRaWan- a LPWAN network protocol designed for low power consumption and long-range communication. It's ideal for transmitting small amounts of data over vast distances.

Mesh network (or mesh Wi-Fi) - a network system that transmits (or repeats) Wi-Fi evenly over an area. In an agricultural setting, a mesh network might be used in a large shed or structure to spread coverage evenly.

Narrowband–IoT- a LPWAN communication method that uses a narrow bandwidth to transmit data, often ideal for low data-intensive IoT applications.

Point-to-Point (P2P) wireless bridge- used to connect two locations together using directional antennas with line of sight.

3: In practice

Case Study - Barbara & Mark Mason

The Masons, who manage “Mirage Plains”, more than 52,000 hectares south of Cunnamulla, have utilised the On Farm Connectivity Program to boost their water infrastructure capabilities in an area with poor connectivity. “We have no mobile reception,” Barbara explains. So when looking to upgrade their water infrastructure, Barbara says their technological solutions had to address that.

This saw the couple **install remote water monitoring technology for their tanks and three rain gauges** around the property. As well as, engaging the services of a supplier to **connect all their irrigation pivots to Wi-Fi, by creating a mesh Wi-Fi zone** on the property totalling 240 hectares.

Barbara says the two water infrastructure upgrades have ensured they can be “a little bit more proactive, rather than reactive” in their approach to managing water efficiency, with data received in real-time via an app. “Before the water monitoring equipment, you would have a helicopter or plane up mustering and they would say, ‘it looks like you have a bit of a water problem out there’, so it was a happenstance kind of thing, rather than a dedicated thing,” she says.

The broader safety implications of installing these connectivity solutions cannot be overstated, she says, in a business that employs four full-time labour units as well as, contract labourers. “It has definitely made it safer,” she says. “Where the Wi-Fi is, it’s made a huge difference, because we don’t have any mobile service.” Explaining that anyone in the 240-hectare radius can now make calls over Wi-Fi, or if outside the area, pick up enough service to send a text message.

Case Study - Elizabeth & Bruce McGregor

Long-time sheep farmers Elizabeth and Bruce McGregor run a mixed farming enterprise in Muttama, just north of Gundagai in the Riverina region of NSW, with their sons. While they grow a small amount of feed crops, their core business is wool and lamb production.

For years, the McGregors were using an unreliable internet connection at their main homestead. The service was patchy, often dropping out and making simple tasks like emailing difficult. Over the last five years, Elizabeth and Bruce began noticing a shift toward digitally integrated farm systems, particularly in the livestock industry.

The McGregors admit they are “not overly tech-savvy” and therefore opted for a straightforward upgrade to maximise impact while keeping things simple.

The shearing shed, critical to their operations, had no mobile or internet coverage, something their shearers frequently raised.

A point-to-point system was installed to beam the signal from the homestead, followed by a mesh system at the shed to distribute coverage effectively.

A camera system was also installed at the property for basic security and to monitor visitors to the farm.

The McGregors reported a significant improvement in their on-farm connectivity, especially in the busy work areas. The improved connectivity has also opened their eyes to more technology adoption that wasn’t previously possible, including investing in a new sheep handling unit that integrates with their existing EID-tagged livestock.

4: Smart planning tools

How to select a connectivity provider

Location - It is important to understand what technology types are available and suitable for your location. The RTH can develop a bespoke report for your individual address, free of charge.

Budget/cost - What are you willing to spend on monthly plans and equipment set-up?

Speed - This will affect how many devices can be operated simultaneously. Do you require higher upload speeds due to cloud phone systems or complex graphic-based solutions?

Usage - How many people and devices will your business connect to the service?

Data - How much data do you require monthly? Streaming multimedia (videos or large file downloads) uses high levels of data. Fortunately, many services offer unlimited plans.

Latency - High latency can affect some VPNs and cloud systems.

Support required - How much support will you require? Many providers offer in-store or call centre support, while others offer only app-based support.

Service Level Agreements (SLA) - Does the provider offer SLA options that guarantee uptime and performance? Is there additional priority support for service issues.

Static IP addresses - This is essential for hosting servers and setting up VPNs.

Picking the right connectivity solution for your farm

When it comes to selecting a communications network for a farming business, there is no one size fits all. While one connectivity solution may be perfect in a beef enterprise in Queensland, it might be inadequate for the needs of a large-scale grain operation in Western Australia.

What matters is the context of your deployment, including location, business requirements and technology use cases. These will dictate which communications network(s) is most fit for your purpose.

Know the problem you are trying to solve

Rather than focusing on the technology first, you need to be really clear on what you want from your connectivity, including what problem you are trying to solve, what you need now and what you'll need down the road. Make sure you build a plan for how you intend to use your connectivity and then identify which technology options work best for you.

Questions you should ask a potential supplier

- What kind of coverage can you guarantee for my specific location?
- How will your connectivity solution(s) integrate with my existing farm equipment and management systems?
- What are the installation costs, processes, downtime, training and timeline for supply and installation?
- Are there ongoing subscription costs or fees?
- What kind of customer support and technical service do you offer post-installation, especially for rural areas? How do I contact you if I have any questions or issues?
- What personal data will be collected from my farm, who owns the data collected?

4: Smart planning tools

What is Starlink Mobility?

Starlink Mobility is a high-speed, low-latency satellite internet service designed for on-the-move connectivity. Unlike traditional satellite internet, which requires a stationary dish, Starlink Mobility provides near seamless internet access while travelling, making it ideal for industries and individuals who operate in remote and regional areas where mobile networks are unavailable or congested.

Limitations

- **Expensive initial setup costs-** including purchase of dish and potential additional costs including installation, mounting hardware, or batteries.
- **Power supply requirements-** vary significantly across Starlink models.
- **Power consumption-** requires a constant power source.
- **Weather/ obstruction sensitivity-** heavy storms or dense cloud cover, forests, tunnels can affect signal strength.
- **Coverage issues-** may affect some users who experience service prioritisation issues when network congestion is high.

Starlink Mobility Plans	Best for
50GB Roam Plan	Wifi calling, light internet browsing, emails, messaging.
Unlimited Roam	Regular video conferencing & cloud work.
Business Local Priority	Reliable priority connectivity for vital operations.

Is Starlink Mobility right for you?

Yes, if you:

- frequently travel in remote or rural areas where mobile networks don't work.
- need reliable high-speed internet while moving.
- can afford the upfront hardware and ongoing monthly costs.

No, if you:

- have access to quality mobile network coverage and only need internet occasionally (a mobile hotspot may be a cheaper alternative).
- have power limitations in your vehicle or boat.

Personal Safety Devices

Personal safety devices are portable technologies that primarily use satellite networks to help individuals - such as those working alone, living remotely, or exploring the outdoors . It allows the user to send emergency messages, share their location, and stay connected with family during remote situations.

Please note: Each device has different features and costs, therefore careful consideration to your situation is important before purchase.

Devices currently available in Australia

- **AIRAGRI PLD**: Farming focused device with farm mapping, safety compliance alerts & weather data integration. *https://www.airagri.com.au*
- **GARMIN Inreach Messenger**: Suited to outdoor enthusiasts and lone workers with weather forecasts & navigation tracking. *https://www.garmin.com/en-AU/*
- **GLOBALSTAR SPOT V4**: Suited to outdoor enthusiasts and lone workers with location tracking & spot check-in. *https://www.findmespot.com/en-au/*
- **ZOLEO**: Suited to outdoor enthusiasts and lone workers with weather forecasts, location check-in & medical advice. https://www.zoleo.com/en-au

4: Smart planning tools

Regional Tech Hub resources

The Regional Tech Hub's website is a free, independent online resource designed to help farmers and regional small businesses improve their phone and internet connectivity.

Sector Specific Knowledge Hubs

- **https://regionaltechhub.org.au/smallbusiness**
- **https://regionaltechhub.org.au/onfarm**

Each knowledge hub provides factual, practical information and tools to support day-to-day operations - from choosing the right internet service, to troubleshooting equipment and improving coverage across your property or workplace.

Key resources include:

- step-by-step help guides.
- real-world case studies.
- tech tips and practical advice.
- listings for webinars, workshops, and local roadshows.

Outages and additional resources

Your first point of call should be to check with your provider as per the details below, and to follow news and emergency service broadcasts.

During weather or emergency situations, RTH will provide regular updates from internet and phone providers on our Facebook page and Facebook discussion page.

Major telco network status webpages

- Telstra - https://outages.telstra.com/
- Optus - https://www.optus.com.au/about/network/service-status
- Vodafone - https://www.vodafone.com.au/network/upgrades
- nbn® - https://www.nbnco.com.au/support/network-status
  - Note that this specific status page does not cover premises connected via business nbn® Sky Muster® satellite service or Enterprise Ethernet and may not reflect all outages.

Additional online resources

- **AgTech Finder** – An independent marketplace helping Australian farmers and producers search, sort, and compare AgTech solutions. An initiative of Food Agility CRC. **https://www.agtechfinder.com**

- **Farms of the Future Program** – A NSW DPI initiative providing training and resources on agtech adoption. **https://www.agtech.dpi.nsw.gov.au**

- **Australian AgriTech Association** – the national body representing the agtech industry and have created an ecosystem map. **https://ausagritech.org**

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