Satellite technologies can reduce farm labour and waste, and improve profit margins. Satellite technologies fall into three main categories:

- **Remote sensing:** Uses sensors and cameras to monitor an area from a distance
- **Connectivity:** Allows sensors, devices and computers to communicate with each other
- **Geolocation:** Provides information on positioning and navigation, for example GPS

There are several startups in Australia that make satellite technology more accessible for producers, making data interpretation and enhanced connectivity quicker and easier. As a result, many producers will access space-based technologies indirectly through products delivered by service providers or through farm advisors and consultants.

Although some satellite technologies are relatively new for extensive livestock producers, some Australian farmers have already seen a good return on investment.

**Livestock tracking**

On-animal sensors that track animal behaviour and location by combining GPS and satellite communication technologies have been developed. This allows farmers to detect livestock theft, predation or escape, to monitor animal welfare, and to assess pasture and land use. Economic analyses show that on-animal sensors can increase revenue by 5-7%, in addition to cost savings

**Virtual fences**

Virtual fences use GPS and smart collars to confine or move livestock without using actual/physical fences. A recent trial of the eShepherd™ virtual fence on a beef cattle farm in NSW found it was effective at keeping livestock where the farmer wanted them within a field.

Created by CSIRO and commercialised by agri-tech startup Agersens, the eShepherd™ works by giving cows an audio cue as they approach the virtual fence, and a small electric pulse if they ‘touch’ the fence. The pulse is less than the shock of an electric fence.

In 2025, a new Australian Satellite-based Augmentation System (SBAS) for geolocation that will go live will improve position accuracy from 1 m to about 10cm across the country. This enhanced positioning technology will improve the accuracy of on-farm applications without the need for internet-enabled real-time kinematic (RTK) positioning.

One of the SBAS Test-bed Demonstrator Trials run by Central Queensland University showed that, in the case of dairy, enhanced pasture use through virtual fencing could save producers up to $100 per cow per year – about $780 million for the Australian and New Zealand dairy sub-sector over a 30-year period.
Water tank monitoring

In 2019, water level sensors were installed in tanks as part of a trial for the Australian Livestock Spatial Innovation Program. The sensors were connected to Myriota Modules, which use satellite connectivity to transfer data from sensors.

The trial included beef farmers from WA, SA and NSW. They received water level information on their mobile phones, saving labour costs associated with driving out to regularly inspect tanks.

One farmer identified a pump failure after stock drained the tank, which was resolved within hours. Another farmer reduced water waste by stopping tanks from overflowing when using a pump on a timer.

Pasture productivity

Images from satellites, coupled with machine learning to analyse data, can be used to assess land condition and pasture productivity.

Cibolabs uses Sentinel 2 satellite images to provide producers with information on pasture productivity and land condition, and to advise on stock rates for available pasture. This helps producers get the balance right between feed supply and feed demand. This can reduce operational and feed management costs by up to 9%, depending on the type and location of the livestock enterprise.

Producers can also learn how much green cover they have, estimate the weight of available pasture biomass, and see if land condition is improving or deteriorating.

The large-scale nature of extensive livestock farming in Australia lends itself well to remote sensing, as satellites can scan large areas relatively quickly and cheaply when compared with drone applications.

Reference

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