

Our world is changing around us. On a daily basis we hear of technological developments that will make our lives more prosperous, our businesses more efficient and assure us a richer entertainment experience. This is the case down on the farm as much as it is in our cities.

What is enabling these changes on the farm, is the explosion of innovative rural technologies.

There was a time when rural technologies were based on mechanics instead of electronics and therefore, were simpler with most of us able to understand them. Waikato Institute of Technology offer a 'Rural Technologies' program that covers skills around motorbikes, ATVs, fencing, tractors and weed control sprayers. Many of us, perhaps of a more mature generation, are familiar with these technologies and, being practical farmers, able to cope.

The many new electronic technologies becoming available for the farm is affecting our ability to cope.

GPS technology used for farm mapping, has led to a whole new 'Precision Agriculture' industry. We now see tractors apparently driving themselves precisely between the potato rows using ground-based devices and GPS-steering. This reduces ground compaction which saves cultivation costs and minimises the volume of soil taken out with the harvest. A zero overlap when working a field maximises the area under production, a gain that goes straight to the bottom line.

Combining soil measurements with soil testing results means that fertilisers can be applied only when and where needed. Combining this with farm aerial mapping and GPS devices, means that variable-rate fertiliser applications will save farmers' input costs and reduce fertiliser run-off to streams.

On the dairy farm, robotic milking machines enable the cow to decide when it needs milking. Cows wear an electronic tag so computers can confirm whether the cow needs milking and hence can go in to the dairy shed, or has just been milked and hence needs to go to a new paddock or is not yet ready to be milked and hence is returned to the same paddock. These robots can operate unattended and if a problem occurs, then the farmer is advised by text message or email.

Coming out of Holland is a new sensor that continuously monitors many aspects of a cow's health. Connect this sensor to the Internet and farmers can then keep a continuous eye on the wellbeing of their investment.

The 'Data Driven Farm' has potential to continuously improve a farm's productivity. Networks of sensors in the paddock measure and report soil moisture and temperature, grass growth, weather conditions and monitor farm security. When wirelessly connected to a cloud-based server, irrigation and effluent dispersal decisions can be made from anywhere and it becomes easy for a farmer to demonstrate compliance with water and effluent resource consents.

In the orchard, the trusty rain gauge and mercury thermometer are being replaced with electronic versions that also measure evapotranspiration, enabling the automation of irrigation and active frost protection measures.

On-farm generation of electricity from renewable resources is now economically viable for farmers. Whether generated from wind turbines, Biochar or methane extracted from dairy shed waste, all systems require remote control and monitoring. If the generator is grid-connected, then safety and load management issues that arise for the power lines company can be sorted through 'smart-grid' technology.

The adoption of the new rural technologies is crucial to improving rural productivity. With the average age of farmers now being around 58 years and rising, technologies like precision agriculture and social networks are central to encouraging younger farmers to enter the industry.