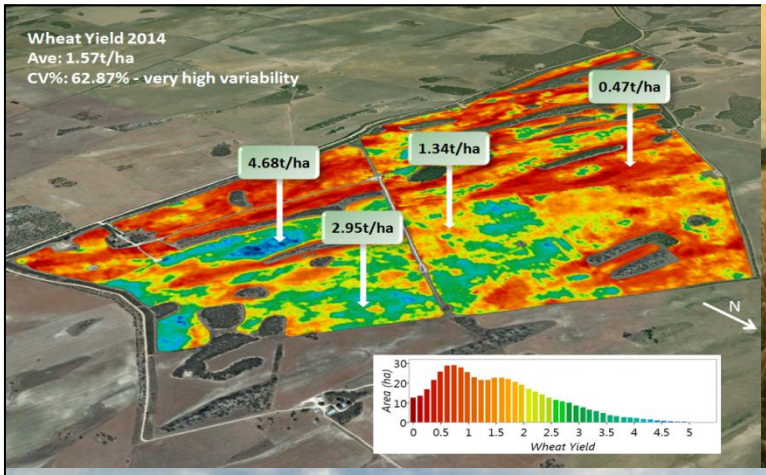


PRECISION CROPPING TECHNOLOGIES

SUBMISSION TO HOUSE OF REPRESENTATIVES AGRICULTURAL COMMITTEE INQUIRY

The Sharp Edge: Technological Advancement in Agriculture

PRECISION CROPPING TECHNOLOGIES

SUBMISSION TO HOUSE OF REPRESENTATIVES AGRICULTURAL COMMITTEE INQUIRY

Company Background

Precision Agriculture (PA) aims to improve a grower's ability to manage within field variability. It provides farmers with tools to manage variability in their farming enterprise and make better informed decisions which in turn gives them much greater control of their cost inputs and much more targeted and effective use of their inputs. These tools are now being used in the agricultural, horticultural and viticultural sector. They are also being used in pastoral and stock management for things such as grazing control and livestock recording.

Precision Cropping Technologies (PCT) evolved 15 years ago in central NSW and as PA technologies developed, the company has expanded its services and now offers precision agriculture support, implementation, data processing and software to farmers across Australia, New Zealand and the United States. Its land forming software is also being sold into Mexico, South America and Europe.

Issues addressing Terms of Reference

BARRIERS TO THE ADOPTION OF EMERGING TECHNOLOGY

LACK OF HIGHER EDUCATION PROGRAMS IN PRECISION AGRICULTURE

Although precision agriculture has become an important tool for farmers the implementation of this has slowed due to difficulty and confusion about how the full power of PA can be maximised. Early users were primarily self-taught and the adoption of these technologies has evolved as their application and uses has been applied. The challenge is to effectively measure, collect and analyse relevant information to make efficient management decisions. To our knowledge there are limited courses available to students as most universities only offer general Agricultural or Agricultural Science courses, some with an additional environmental or economic focus.

PA has evolved to a point whereby the application of these tools has become more universal making it easier for agricultural education programs to include units of study in foundation areas which also complement other basic agricultural concepts and could be included in courses.

These include:

- Learning and understanding spatial data management
- The use of sensors and controllers such as GPS, Yield monitoring systems, remote sensing data and variable rate technology
- Learning to use computer software and in particular Geographic Information Software (GIS)
- Understanding and analysing yield variability and the factors causing this
- Strategic sampling and on farm trials
- The development of site specific management plans

Whilst it is widely acknowledged that there has been a global trend towards a reduction in enrolments in agricultural courses, this trend appears to have reversed and they are now on the rise. As has widely been reported crop production will have to double by 2050 to fulfill the needs of a growing population and well educated graduates will be in demand to optimise future agricultural production giving ongoing encouragement and job security to those considering a career in agriculture.

The University of New England at Armidale offered a Graduate Certificate in Precision Agriculture but as of 2016 will no longer be offering this course.

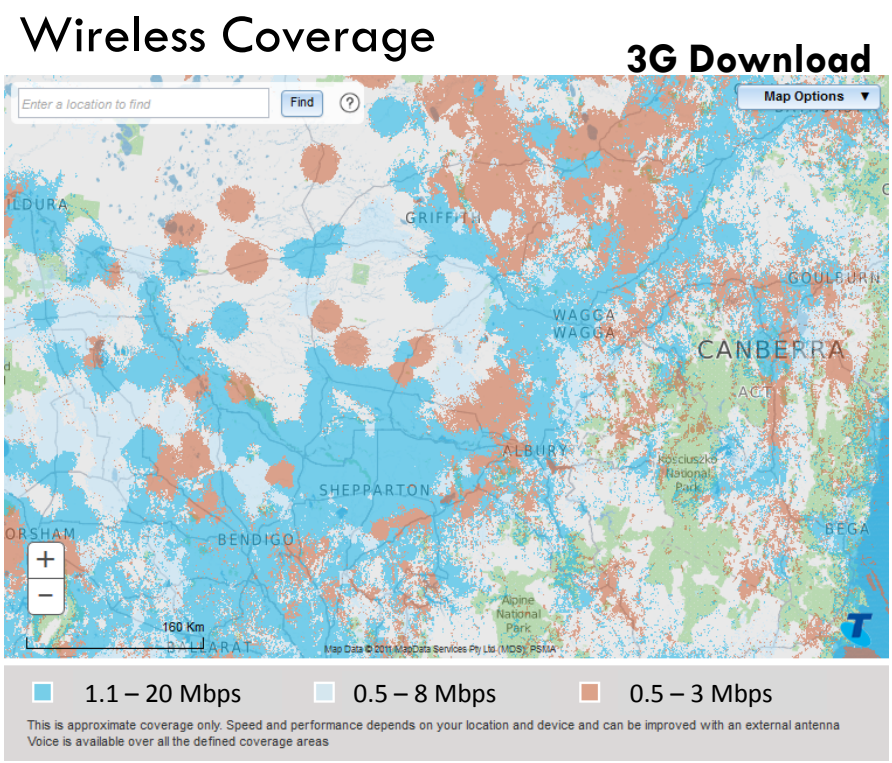
We see a strong need for educational programs to include concepts in precision agriculture as part of their learning process.

INTERNET ACCESS AND DATA UPLOAD AND DOWNLOAD

With the evolution of Precision Agriculture farmers are now generating and are able to access a wide range of information (data) which they can use to make more informed decisions about their farming practices. The types of information now being used includes yield data collected at harvesting, "as applied" information such as fertilizer, seed and machine performance collected at planting, satellite imagery, NDVI (Near InfraRed imagery), electromagnetic and gamma radiometrics soil survey maps, Phosphorus and soil nutrient testing information and more recently Drone images. This vast array of information is usually georeferenced with GPS coordinates and can be digitized into maps which can give powerful information on which to make timely decisions about farming practices.

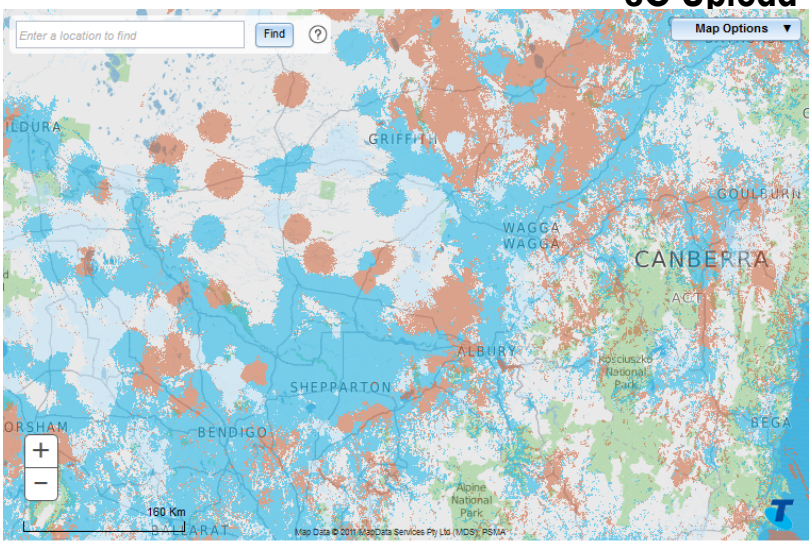
The Internet has changed how many businesses operate and this includes farmers. The new buzzword in many sectors is “big data.” Big data starts with the fact that there is a lot more information floating around these days than ever before, and it is being put to extraordinary new uses. PA has been targeting the use of big data in cropping systems to make an increasing number of decisions per hectare/per season in crop management. This is because the potential financial benefits from using data to better manage inputs to match variability in operations can be significant. The scale and extent of the data requirement is driven by the uniqueness of each field and farming business.

The transfer of this data from the farmer to and from his Precision Ag support business and Machinery dealer is becoming an increasing challenge. In only recent times farmers used small 128gb data cards to store and transfer data. This quickly graduated to 512gb and then to USB storage. The latest method of data transfer is via wireless “on the go” between the machine and the farmers office computer and onto their machinery dealer or Precision Ag support company. Of course this data transfer relies on decent wireless internet access. The reality is that this is not available in a vast number of regional areas. Data transfer is required both through download and upload. Whilst internet service may be available in some areas upload band width speeds are considerably diminished in many country areas. At the recent Society for Precision Agriculture conference held at Wagga Wagga, the most widely discussed issue with managing farm data is the lack of internet access and limited upload bandwidth (slides below from presentation at the symposium "Big ideas for using Data" Brett Whelan, Associate Professor in Precision Agriculture, Precision Agriculture Laboratory, University of Sydney).



Wireless Coverage

3G Upload



Data weight

<u>Uploading Data</u> (generic shp files)

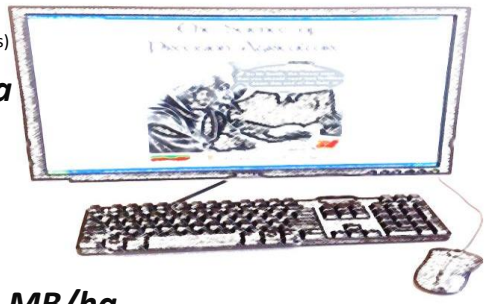
UAV imagery –10 MB/ha

Spraying – 0.7 MB/ha

Planting – 13 MB/ha

Yield data – 10 MB/ha

Soil Mapping – Data 1.5 MB/ha



<u>Downloading Data</u>

Prescription files – 0.02 MB/ha

Source: T. Griffin. Kansas State University

As more and more digital data becomes available farmers are using this out in the field to “groundtruth” and verify identified issues showing in their data via tablet and Ipad technology. It is a regular complaint to our company that many farmers are unable to access their data which we supply to them online due to limited or nil internet access on their property. The use of satellite imagery is increasing and the development of technologies such as LiDAR (remote sensed light detection imagery) will only increase the demand for the transfer of large data files via the internet or mobile phone coverage.

Whilst many regional areas have been serviced by the major two providers in Telstra and Optus you only have to travel a short distance out of most towns to encounter severe black spots, even in many populated farming areas it is often likely that there will be no coverage at all. This makes it impossible for farmers to access their data and puts them at a severe disadvantage. We have clients in many areas of Australia who report they are unable to access their data online.

Whilst we are aware of the NBNco satellites being launched at the end of this coming year the government will need to pay strong attention to the future needs of farmers as the need to upload and download data to work smarter in their farm businesses becomes much greater. Perhaps there needs to be some cheaper cost effective options for regional communities to get full and reliable internet and mobile coverage such as sharing private mobile infrastructure or creating small community networks.

Regardless of the solutions - the need for "true" mobile coverage in all rural production areas is vital as Australia strives to become a world leader in agricultural production into the future.

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