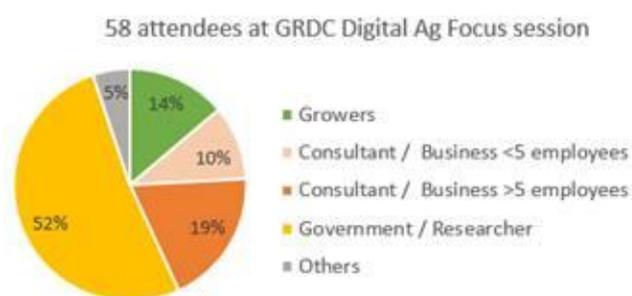


Focus session: Making digital ag technologies work for grains growers

Convenor: Prof Simon Cook

The rise of 'big data' is revolutionising societies and industries globally, with considerable potential for productivity gains. However, the uptake of digital technologies in agriculture has been low. It was listed by a recent McKinsey report as the worst amongst 22 economic sectors globally. Critics suggest that while much of the promise of digital agriculture is fuelled by optimism, change will occur only when users see *real value* in the use of these technologies.

The objective of this focus session was to separate the 'hype' from realities using the expertise of a range of professionals in the field. There were 75 attendees at the session, 58 of whom left their details for follow up contact.



After a brief introduction by Myrtille Lacoste (Curtin University), Mike Briers (Food Agility CRC) talked about the CRC's perspective on digital agriculture, likening "AgTech" today to "FinTech", the revolution in Financial Services that was enabled 10 years ago by the development of stable under-pinning measurement systems. He asked: "what are the data needed by agriculture to transform the industry?"

Prof Simon Cook then reviewed what digital agriculture means to Western Australian grain growers. He argued that value would arise from building both the human and natural capital on which our agricultural systems are based, especially by improving production efficiency and profitability, farm resilience and 'investability': using data to grow investment in the industry. Technology, agronomy and management are all required to capture value from digital agriculture, and change in management will require engagement and innovation. Prof. Cook said that on farm experimentation (OFE) is ideal because it builds on farmers experimental curiosity in an environment of co-learning and innovation, and can be easily implemented using existing machinery and technology.

In the following session, industry consultants shared their experience, and researchers contributed their understanding of the latest evidence, after which the group held a general discussion.

AgTech consultants Frank D'Emden (Precision Agronomics Australia) and Joel Andrew (MapIQ) demonstrated their use of gamma radiometrics for defining zones in paddocks to be managed differently for nutrition and soil amendments (deep ripping). There is great demand for such work, with requests initiated from both farmers and consultants. Discussion focused on the difficulty of data analysis (data handling in multiple software packages) and analysis, and of quantifying the benefits of zoning given uncertainty about the zones, fertiliser rates and changing seasonal conditions. Joel Andrew fielded a question about the role of growers in this process. He and Frank D'Emden agreed that farmers' requests range from "just wanting a recommendation" to requiring a deeper understanding about how the data are used to answer their questions.

Luke Dawson (CSBP) discussed CSBP's plans for on farm trials in 2018, emphasising the need for large experiments. Results from paddock-scale experiments have greater relevance than traditional plot trials because they reintroduce the varied aspects of farming systems and incorporate a greater number of variables. For instance they can be implemented using existing farm machinery, and the results are better received by farmers. Issues to be addressed are how to statistically quantify and analyse data from large scale experiments. CSBP plans to implement through the Food Agility CRC a limited number of trials initially, with the goal of OFE gaining momentum within three years, so that it becomes embedded in the industry in WA and across Australia.

Researcher Dean Diepeveen (DPIRD/Murdoch/Curtin) then presented thermal imagery collected by drones of plot trials growing barley at a Katanning site to examine differences in crops under different temperatures. The goal of this work was to develop a useful tool for assessing crop damage, including by frost, and to determine whether canopy density could be used a predictor of yield. Dean noted that considerable manual processing is required to prepare the data and then the images were assessed visually.

Fiona Evans (Premier's Midcareer Fellow in 'Big data in agriculture') spoke next about methods for analysing data from on-farm experiments, and whether OFE can help build better predictive models. She showed that traditional ANOVA analyses of strip trials can give incorrect results because they do not integrate the underlying spatial variation across a paddock. She described new statistical methods for modelling the response variable and spatial variation simultaneously. She also showed how yield potential can vary across a paddock, and discussed the implication of this when using fertiliser response curves to determine how much fertiliser to apply. Questions were raised about how to understand spatial variability and interpret it with respect to underlying soil types, and what role big data could have in bringing new understanding at the regional scale – it will become possible when there are enough experiments over enough of the landscape.

Roger Lawes (CSIRO) then discussed how to challenge the status quo and make it all work. "Given that it is easy to identify big gains in agriculture from enabling technologies", he asked "what will motivate people to use and adopt these practices?", in particular:

- What enabling technologies do we need?
- What decisions and practice changes do growers need enabling technology for?
- What are the "big decisions" that growers can make?
- How can we build resilience through monitoring?
- How do we deliver the right information needed to make decisions?

The ensuing discussion raised a number of issues:

- As tech gets easier to use, more people will start using it. Is usability really a challenge for developers?
- Is there a lack in human capacity, i.e. people and services with the adequate skills, to help growers get on board with using technologies in the industry?
- How to we achieve co-learning, i.e. bringing growers on the journey to understand what they want to know, and what information from what data are needed for this?
- Considering the paradox that "if it's free, nobody wants it" – do we put a price on data and analytics or is it better to engage growers to want it?
- Can we state the value proposition in dollar terms?
- The more farm data is shared to make bigger regional data sets, the better for the industry, but how are trust and legal challenges overcome?

Major themes arising from the discussion were around: (1) data wrangling – how to make it easier and simpler so there can be broader uptake; (2) soil diagnostics and constraint mapping – understanding spatial variability; and (3) co-learning – some farmers may want to be involved, but not all.

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Actions to progress the opportunities or solutions discussed:

- Establishment of WA Centre for Digital Agriculture
- Development of WA node of Food Agility CRC, and in particular the 'On Farm Experimentation' project

List of invited speakers and contacts:

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