VISUALISING AUSTRALASIA'S SOILS:

SOCIAL ENGAGEMENT & COLLABORATION LEARNINGS

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Dr Amie Sexton, CeRDI, Federation University

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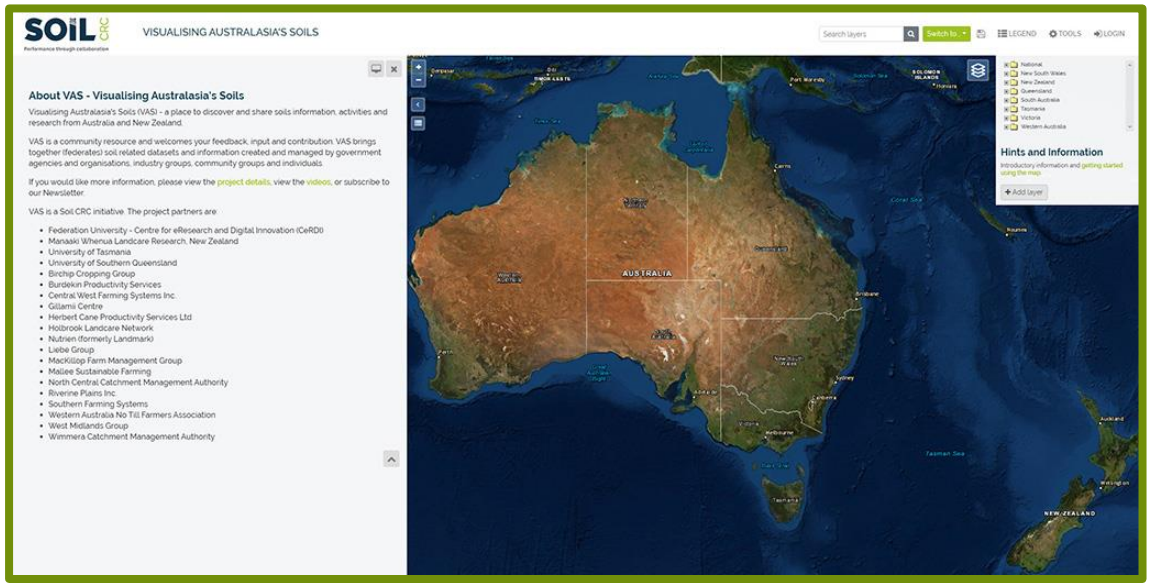
PROJECT OVERVIEW

Visualising Australasia's Soils (VAS) aims to provide Australasian farmers, agronomy practitioners, agricultural researchers and agribusinesses with relevant place-based information on demand via an online platform. The VAS's interoperable spatial knowledge system provides Soil CRC participants, and the broader agricultural industry, with access to data, information and knowledge on Australasian soils. It includes a data stewardship and governance model for custodians to clearly set the rules for access to their data. Increased availability of soil data will encourage and enable the generation of new research ideas, collaborations and investment, both locally and globally. In doing so, the purpose of VAS is to enhance decision making and generate new insights into the profitability and resilience of Australian agriculture.

The initial focus is on supporting CRC participants to provide soil data and to improve data stewardship and governance. Participants will also be involved in collaboratively designing the portal tools, models and visualisations (e.g. spatial visualisation, search, filtering and download tools). Education materials will be developed to support broader adoption by researchers, agronomists, project managers and farmers, and social research will be conducted to assess engagement, practice change and other project impacts.



https://data.soilcrc.com.au/map/about

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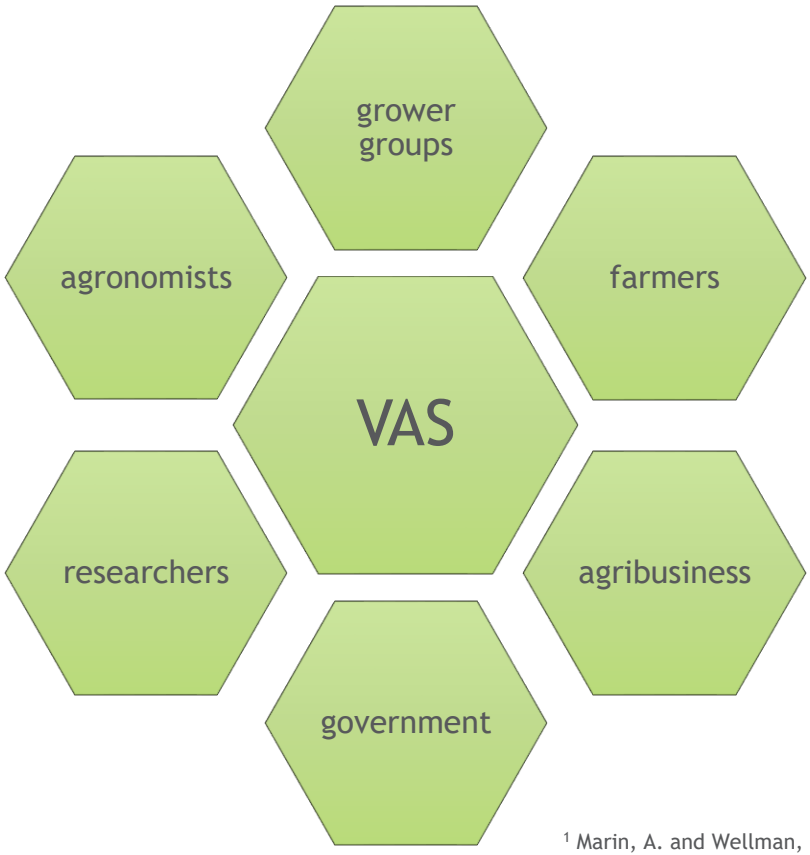
CONTEXT: SOCIAL NETWORK DIAGRAM

The VAS portal brings together data from many sources – government, research, commercial and private – and thus exists in a social network. The diagram below represents the network from a VAS perspective, i.e. VAS in the centre, but acknowledges that all parties are connected independently and in different configurations when considered from view points with a different focus. Each of the different participants uses and contributes data in different ways, according to their resources and interests. Despite the different purposes and needs, they are all connected through the portal, via the data and the subsequent research and practice outcomes. They are each reliant on each other for data quality, accuracy and timeliness. As such, there are careful protocols for data sharing to respect the level of sharing that each contributor is comfortable with. In terms of data usage, the portal allows each participant to display and collate the data in a way that is specific to their needs, location and interest.



The diagram represents the various groups of contributors and users of the portal. They are connected in an open-system network via the VAS and are dependent on each other for the contribution , quality and use of information. The network is not static, but rather is a movable web of connections that shift over time according to influences such as the project stage, individual needs, seasons, or economics.[1]

The portal creation and ongoing development is dependent on these connections to function – for design, data, and application. It requires cooperation, collaboration, a shared vision, mutual respect, consideration and understanding.

[1] Marin, A. and Wellman, B. Chapter 2. Scott, J., & Carrington, P.J. (Eds.). (2011). The Sage handbook of social network analysis.

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SOCIAL ENGAGEMENT & COLLABORATION AIMS

To maximise use and impact of the VAS project, the interaction with contributors and users must be carefully considered throughout project development and delivery. In early 2019, the social engagement aims for the whole project were described as follows:

- Engagement
  - With industry, farmers, researchers, government
  - Groups advocating use of the portal because there is an obvious benefit
  - Case studies/examples of the value proposition to farmers, advisors, grower groups and catchment managers
  - Build trust, allay fears, understand and promote incentives to share
- Use-cases
  - Clear use-cases from end-users to inform portal functions and design
  - Clear examples, demonstrations, reasons for the portal (other than just data supply)
  - Case studies and examples of the value proposition to farmers, advisors, grower groups and catchment managers
  - Develop a better understanding of user expectations
  - Demonstrate value to both grower groups and researchers to build engagement
  - Training, helpdesk, user support (by finding out what, when and how people need assistance)
- Social engagement will:
  - Establish the use-cases
  - Establish the value proposition
  - Assess success or failure
  - Provide a baseline from which to assess the impact of data federation

PROCESS & PRINCIPLES

We developed a process to address these questions and aims at the beginning of the project. It focussed specifically on the grower group partners who will be providing a large part of the initial farm data. The process is exploratory in nature, designed to discover how grower groups perceive the project and their participation: the value proposition, their motivation to participate, potential uses of the portal; and to build relationships and trust between the university based researchers and developers and grower group staff.

The three-step process uses observations, photographs, video and audio recording taken at meetings, and interviews. At this stage, Step 1 has been conducted and Step 2 is progress.

1. Get to know contributors – identify their problems, needs, expectations, motivations, concerns and hopes; build relationships and trust, and understand their perspective.
2. Set principles – explain the project and how we think it's going to happen; set these principles in the first meeting and revisit throughout the project; follow meetings and interactions as the project progresses.
3. Follow up at the end – when the portal is fully functioning; find out where it meets expectations, where it falls short; find out how it solves problems; capture examples of '*this is how we used to do X, and this is how we do it now we have VAS*' or '*this is the problem we had, and this is how it has been improved.*'

Tools:

- Develop a template and guidelines so that others in the project can also capture data and stories.
- Observational notes, video/audio recordings, photographs and interview transcripts; supported by any relevant documentation.
- Materials collected can be used to better understand collaborative aspects of the project learnings AND for communications and engagement in the form of short videos, podcasts and/or text. These can include general principles and examples such as user stories and case studies.

This process is:

- Low effort for participants as it is mostly observing and documenting activities they are already involved in.
- Builds relationships and therefore trust, which means they are more likely to share their data and advocate data sharing to their network.
- Open to concerns, issues and opportunities that arise during the process.

STAGE 1: PROJECT START

- Participants: 16 grower group partners from across Australia, who had agreed in principle to supply some data for VAS, and were offered $10,000 to assist with time and resources to collect, format and provide that data.
- We contacted them to arrange a meeting, and although the organisations had agreed to be part of the project at the funding application stage, many of them had had changes in staff and therefore did not know much about the VAS project. Most groups were keen to meet, particularly since we were going to visit them at their premises, rather than asking them to visit us in Ballarat or meet in a major city.
- We visited fourteen of the sixteen partners among the farming groups. (We were unable to meet with Leibe and Landmark for different reasons.) All visited organisations agreed to contribute data and, at the time of writing, eight of these groups have provided data and collected the first half of the payment.
- This first meeting was designed to cover Step 1: Get to know each other and to begin Step 2: Set principles . All meetings took place at the grower group offices and lasted approximately 2 hrs, followed by a short video interview.
- During the meeting, the VAS team explained the project and what it is looking for from grower groups. The discussion were robust and in-depth, particularly around access controls, a nearly all of them ended with a level of enthusiasm and possibility from all participants.
- The short video interview was conducted after the meeting with only one person from the VAS team. The VAS soil, data and technical specialists left the room to reduce the likelihood of power imbalance between project leaders and project participants, and to encourage the participants to be at ease and to talk freely about their involvement in the project.

INTERVIEW QUESTIONS

1. *Why are you participating in this project?*
2. *What are you hoping to get out of being involved?*
    - *short term / long term*
    - *individual / organisation / sector*
3. *Do you have any concerns about the project or your involvement?*
    - *Are there any challenges? Specific or general*
4. *What do you see as the opportunities and possibilities of this project to change things positively in the sector?*
    - *How?*
    - *What?*
5. *In terms of project management, what will help to make your involvement easy and positive?*

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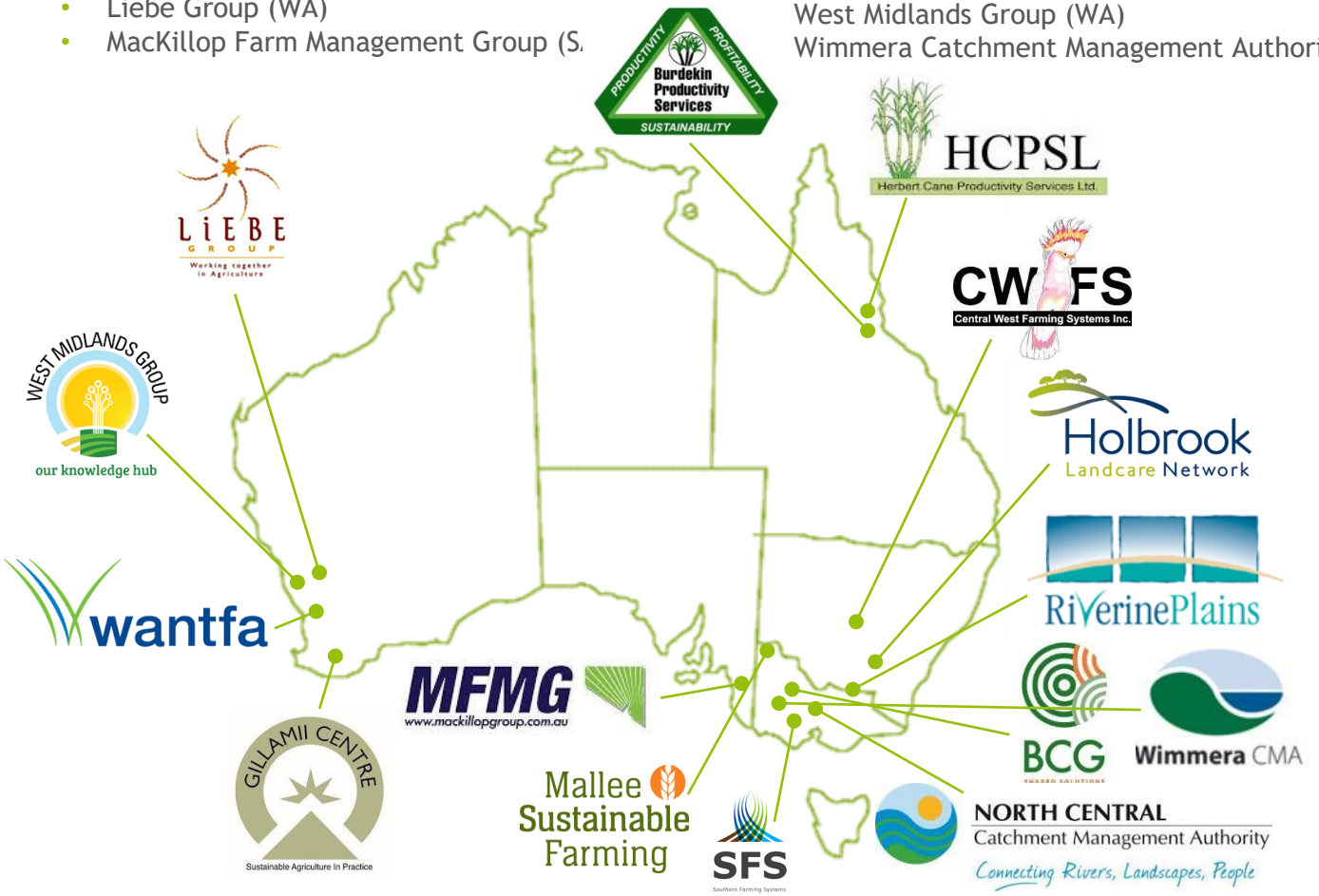
GROWER GROUPS: DATA CONTRIBUTORS

Participating Grower Groups:

- Birchip Cropping Group (VIC)
- Burdekin Productivity Services (QLD)
- Central West Farming Systems (NSW)
- Gillamii Centre (WA)
- Herbert Cane Productivity Services (QLD)
- Holbrook Landcare Network (NSW)
- Liebe Group (WA)
- MacKillop Farm Management Group (S.
- Mallee Sustainable Farming (VIC)
- North Central Catchment Management Authority (VIC)
- Riverine Plains (NSW)
- Southern Farming Systems (VIC)
- WA No-Tillage Farmers Association (WA)

West Midlands Group (WA)

Wimmera Catchment Management Authority (VIC)



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DATA SHARING: ACCESS CONTROLS

At the initial meeting, there was an in-depth discussion of access controls and how data contributors are in control of who sees their data, to what level of detail, and for what purposes it can be used. This can be changed by data contributors when and as they wish. The short animated video explaining VAS was shown at the beginning of this part of the discussion, followed by an explanation and discussion of the table below. Understanding access controls was a key step in building trust and allaying privacy fears for grower group representatives. In all cases this part of the meeting was lengthy, and once it had been discussed in detail, participants relaxed (evident in their body language and tone of voice) and the conversation moved from *if* they would participate to *how* that would happen.

Q1: Do you own the data? Or Are you empowered to make decisions about the data?
Q2: Is the data availability subject to a licence? (e.g. written in the funding contract?)
Q3: Are you willing to allow access to all or any of the data?
Q4: Which data sets are you willing to allow access to and subject to what conditions?

Soil moisture probes (PAW% - whole profile)

Rule / Who	Location accuracy	Embargo	Attribution	Non-commercial	No derivatives	Share alike
Public	500m pixels (randomised)	Past seasons only (12 month delay)	Yes	Yes	No	Yes
Club	Paddock identified	Current data	Yes	Yes	No	Yes
Private	Accurate x, y ,z	Current data	Yes	Yes	No	Yes
Access via an application	Accurate	Current data	Yes	Negotiable	Negotiable	Negotiable

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VALUE PROPOSITION - BENEFITS

At the beginning of the project, the VAS team assumed that the financial incentive was the main reason for grower groups to participate in the VAS project. It became very clear early in the meetings with grower groups that the value proposition is actually assistance with data management, a tool to assist and engage with grower members, and connection to the wider industry.

- Data management
  - standard format, stored securely, organised, easily accessible
  - succession planning for knowledge transfer that means data is not lost when staff leave
  - data viewed context: local, regional, state, national
- Data collation
  - big picture of farm, region, activities,
  - connect all the projects – historical and current, on varying topics – by aggregating data and research
  - avoid duplication
  - see trends over space and time
  - direct new work a based on existing data, or lack thereof
- Data as evidence
  - for funding applications, banking, insurance,
  - acknowledgement of efforts to improve practices
  - assurance for implementing new ideas
  - underpinning on-farm decision making
- Engagement
  - with members
  - visualisation for better understanding of data and analysis
- Collaboration and connection
  - Connecting with a range of industry experts to assist with problems and innovation
  - Finding out what other growers and groups are doing

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ISSUES, QUESTIONS & CONCERNS

While overall the feeling from participants was positive and enthusiastic, the meetings raised a number of concerns about data sharing, privacy, resources and respect. Most of the issues stemmed from past experiences where best practice had not been followed, commercial interests trumped grower benefits, or lobby groups had used data to persecute growers.

- Data sharing
  - privacy
  - security
  - trust – will the data be used in ways that benefit growers
  - context – if data is accessible on the web, will others understand its context?
  - interpretation – will data be interpreted correctly (and decisions made on that) if there is no need to contact people with local expertise?
- Resources
  - time – to enter and manage data
  - skills – unsure if they have adequate skills for data management
  - people – difficult to find staff in rural and regional Australia with higher level data management knowledge, skills and experience
- Respect

  providers of on-farm data (growers, project managers, local researchers):
  - seek respect, involvement, recognition, and assistance.
  - need to be acknowledged for the time, effort, money, knowledge and experience that went into producing the data.
  - want to be recognised as unique individuals, organisations and places with their own characteristics, opportunities and challenges.

BENEFITS

Interviewees were mostly interested in the big picture, acknowledging that the importance and principles of managing soils and soils data are the same across all sectors of agriculture. Some of the overarching benefits cited were the portal's ability to reduce duplication, to enable funding to be used as efficiently as possible, to make the most of the data that is collected and ensure its usefulness into the future, to identify critical issues, and to see if practice changes are having the desired effect.

> *'We sit between the rainforest and the reef so we're an environmentally sensitive area, especially in relation to nutrient and pesticide runoff. So understanding our soils and getting the best management options available will actually have a positive effect and meet our environmental targets and also we want to be good environmental stewards for the land which we manage.' GG4**

> *'It's really great to able to pull that critical information together and have it almost customised to your needs and your ability to store information, upload information, and use that to really inform future decisions and also to support your local community and farmers.' GG15*

- Short Term

Participants saw a range of short term benefits that include: an opportunity and incentive to collate, standardise the format and organise data with support from the VAS team, then start to analyse that data; as an extension tool to engage with and teach growers; and to learn how to use an online data portal.

> *'Helping us understand and organise our datasets is a great start. Also trying to have them in a form that's available and useful. I think too much data gets locked away and it would be nice to have our data accessible and used.' GG14*

- Long term

Long terms aspirations for participants are very much an extension of the short term benefits: understanding the data and the portal and how it can be used to inform better decisions; being able to deliver geospatial data on soil to staff and growers, and to work with members to encourage data-driven decision-making processes that add value to their farming system.

Other identified long term benefits include the ability to identify trends and practice-led change; to help quantify the impact of R&E activities; to direct research; and as concrete evidence for future research funding.

*GG = grower group. Numbers have been randomly assigned to each of the participating groups.

BENEFITS

- ## Organise data

Grower groups were enthusiastic about the VAS project posing an opportunity to organise their data, to learn data management skills, and to federate data to increase its usefulness. At a practical level, the VAS portal represents a safe and trusted storage facility with easy and instant access, that is part of a larger data set, locally and nationally.

> *'I think one of the values of it is to be able to just sit down on a computer, click a few buttons, and there's your data. And then present that data in a way that's readable and easy to follow. At the moment that's hard to do – it's clunky and very time-consuming.' GG5*

As technology develops and the amount of data collected increases, the need for improved data storage is also increasing, and an online portal is seen as a way for farmers to extend their digital capacity.

Participants saw it as way of improving data management processes by creating order and structure in existing data, developing strategies for data handling, and enabling new data to be uploaded to the portal and integrated immediately. The next stage would be to develop strategies to utilise the data better.

> *'We have a lot of data that we have collected and we'd like to have that organised and be able to visualise that … and ultimately hopefully come up with some trends of changing soil conditions over time but also be able to monitor those trends into the future. And have that portal set up area that we can then use going into the future for future data collection.' GG7*

Another benefit is being able to see the links between different projects so that it becomes a continuous data set. Grower groups were enthusiastic about being able aggregate data sets from all their projects, integrating historical and current data from a range of activities. This is useful not only for individual grower groups and their data, but also for the sector as a whole as it brings together data from many different sources to create a more detailed picture with multiple layers.

> *'… that's a good opportunity to build something up to a big common data set that can deliver useful information at a scale that is actually practical -1km scale soil grids might be good to look at from an NRM planning point of view, but it's not really practical for a farmer to implement.' GG13*

Participants saw a direct link between data organisation, security and accessibility, and the usefulness of that data.

> *'I'm a really big fan of there being a central and open repository for RD&E that is … publicly funded or funded by us and in a useable format. …There's a lot of research that has gone on in the past however many years we've been doing research in the agricultural sector that is stored away in cupboards and that's not necessarily accessible or being used. So I think that's a really positive thing for there to be that place where the research is kept that we know that it's secure, it's not going to get tossed out or accidentally deleted by someone pressing the wrong button and that it will be accessible in the future and that it's not going to disappear overnight because somebody has pulled funding from it.' GG10*

Participants also saw value in developing practical, clear processes and protocols to allow for better data sharing in the sector.

BENEFITS

- ### Knowledge

Participants were all very clear about the power of knowledge to improve farming systems. They see their role as a grower group to provide members with good, accurate information to give them the knowledge, confidence and skills to be able to make changes to their practices that will protect their assets. Grower groups can see how using soil-use information in data-driven decision-making processes empowers members to make good decisions to protect the soil, adding value to their farming system. They are actively seeking opportunities to improve services for their members and the VAS portal represents a means to provide better information.

> *'Finding more information about collecting data on soils is really important for our farmers. And I think that the more information and knowledge they have on what's happening in their own soils on their properties will give them greater decision making tools to make better decisions, become more profitable, and have more sustainability in their farms.' GG8*

Participants saw the potential for VAS to facilitate the adoption of research, explaining that adoption is a difficult task for science, but VAS can show it in a way that is meaningful to industry and growers. There was also an understanding of the value of the data for research if interrogated by experts and a recognition of their own limited capacity for interpretation:

> *'… the data might tell other stories than the purpose it was collected for. There is potentially a lot of unintended benefit if data is interrogated by others.' GG14*

- ### Visualisation

The visualisation was seen as a great way to engage with growers, providing information in a format that is easy to understand and relevant. Participants were enthusiastic about the VAS' ability to provide spatial data, specific to their needs, with an ability to choose the layers they want. There was also discussion of the power of maps to show people where they fit into the bigger picture and as '*you zoom in you see the story unfolding*' GG14.

> *'Tables of data might do it for scientists, but it doesn't do it for growers! Being able to zoom in on a region to whatever level and finding out what is relevant to that region, whether it's a farm or a district, is really powerful.' GG14*

> *'I think sometimes farmers feel that there is a lot of criticism about what they do. And often they do a lot to manage their soils, and I think that would be great to be able to see that that area that they put lime on or that they've worked hard at protecting has worked. So I think it's really important for them and for others as well.' GG8*

There is also value in being able to show the big picture of work from all the small, separate projects that are conducted by a grower group.

> *'…to promote the extent that we cover. So the paddocks that we've surveyed, and historically where we've been. I think that's going to be really important to showcase how many soil tests we actually do take and the breadth and the extent that we cover.' GG3*

And ultimately that the visualisation is an easy and efficient way of quickly seeing the data in a useful and relevant way.

BENEFITS

- ## Big Picture & Trends

The ability of the VAS portal to show the big picture and trends over time was seen as a benefit by all grower groups. The 'big picture' defines a number of things: the ability to see and measure change over time, to compare different sites and identify highly productive areas and ascertain what practices have contributed to success. This information supports decision-making on a spatial basis, addressing questions such as which areas of the farm are performing well, which areas need attention or should be switched to a different purpose. Participants also saw the usefulness of the portal as a research tool that will allow them to look at the big picture and see what needs to be investigated, either because it is highly successful or performing poorly. In WA, the big-picture concept is particularly applicable on a farm scale as acreage is large, treatments are on a large scale, and therefore each decision made carries a proportionally large risk.

> *'Long term I see it as a valuable tool for farm management decision making: what farm practices are making a difference to their farm? How they track those differences over time, how they compare to neighbours' farms, how they compare on the national level." GG5*

> *'… moving into future data collection in a way that everything actually adds value to everything that we're already doing rather than the risk of reinventing the wheel every time we start a new project. So from now on, every time we take a soil sample or we contribute to a project that we've got ongoing we're adding to our knowledge base in the region.' GG3*

The growing social importance of being able to show that growers are looking after the land on behalf of the community – social licence to operate – was also raised.

> *'Into the future, we're going to need to demonstrate that farmers are good custodians of the land and that they are managing it effectively. And being able to store and retrieve data and show trends over time is going to be a really important part of that. This project can underpin that future as well.' GG2*

- ## Funding application evidence

Grower group participants across the board saw the use of VAS as useful means to provide evidence when applying for project funding. VAS has the capacity to show evidence of previous activities and the impact of previous funding for projects. It is also seen as a way to build a case for funding a problem.

> *'If we can get an idea of the state of the management area – e.g. see the high risk area, we can use that as a case to build a case for funding to help fix that problem or work with the landholders to improve that problem.' GG7*

> *'It will enable us to be able to see trends in our soils and also have justification for applying for funding grants through problems. Or maybe even some potential improvements that the growers in the district have made and we want to find out exactly what's going on. So we'll have more power in our funding applications.' GG8*

BENEFITS

- ## Collaboration & Connection

All grower groups perceived the VAS project as a means to connect and collaborate across the industry and research. As larger organisations are increasingly moving to a centralised model and reducing offices and staff in the regions, local grower groups are being forced to work together more. Data sharing is part of that and is perceived as a tool to enhance collaboration.

> *'With the current resources and scope you're never going to be able to work over a large scale unless you're collaborating. So this is almost like we're going to work independently like we always have, but it will be a really easy way, if other groups and organisations would be willing to share, to see that information spread across.' GG15*

The VAS project is also perceived as a way of connecting with others in the agricultural network. Working in agriculture, by its very nature, an isolated occupation. Even though grower groups bring the local industry together, there is limited opportunity for wider collaboration and connection in the time-poor modern work environment. VAS, as a collaborative project, offers opportunities for participants to connect with other grower groups, researchers, universities, and government departments, and that connection is something that grower groups (and many of their members) are seeking.

> *'At the moment there are a lot of people working towards a common goal for the greater good with the data that's out there and the risk is that the world is a busy place and you get very insular. So we get like that with projects and I know that the unis and the departments and everyone else are the same. So anything we can do to make sure that anything we do next builds on whatever we did before is valuable.' GG14*

> *'Number one: being able to analyse on-farm management practices that are making a difference. … So the biggest impact for farmers is to have confidence that what they've done on their own farm is working, but also have confidence that what they may want to do in the future is actually working elsewhere.' GG5*

Being connected into a larger project with a range of collaborators represents an opportunity to see what is happening in other parts of the industry, both geographically and organisationally, to learn from a broad range of professionals, and also provides access to experts to call on when assistance is required:

> *'In relation to the Soil CRC … we thought this was quite a good opportunity where we can put forward some of our concepts or concerns or issues and raise them and actually have people come and work with us from the universities to assist us and help us find solutions for some of the issues that we have.' GG4*

> *'The partnerships we make by interacting with FedUni and all the other partners are important to us as well. So that when the opportunity comes or the issue arises, we know who is moving in the space and what information is out there.' GG14*

Participants also expressed a desire for communication with other groups about how they are managing the VAS project – finding out what other have done and what has been successful with data contribution and member engagement.

CONCERNS

- Privacy/security

The most pressing concern for grower groups was data privacy. This includes the organisation's responsibilities and obligations regarding member data:

> *'One thing that we are very mindful of is around privacy, data, and the privacy act and what our obligations and commitments are there. And around confidentiality of data – making sure that we don't compromise in any way our membership's data. That it's secure, we meet our obligations under the privacy act, and that we respect the individual grower's confidentiality.' GG4*

and ensuring that growers understand and are comfortable with how their data is handled:

> *'Ensuring that we've got the right permissions from the right people, and that they understand how their data might be used going forward. Not only by us, but also by other people if the data is publicly available.' GG10*

Grower groups were very mindful of respecting data sharing agreements with existing data and making sure appropriate processes are in place for future data collection.

> *'When you're looking at data going forward it's not a problem because you make that clear when you collect it. With the data sets we already have, there's probably been a range of understandings about what might happen with that data. So that's the only thing – going back and making sure that people whose properties we've collected data from are comfortable with that being put up on publicly available access at whatever level.' GG14*

- Trust

Issues of trust were raised across the board by participants with regard to data sharing, indicating an area that needs to be overtly addressed throughout the project. Both the safety of the data, in terms of reliable storage, and access to their data by third parties were raised as significant concerns. The initial face-to-face meetings with grower groups was regarded as a very positive step in building trust between grower groups and the VAS project. Participants spoke about problems in the past with commercial companies trying to obtain data and data control, and the misuse of data and its ramifications.

Acknowledging the issue of grower trust in the portal, participants described a gradual process for integrating VAS into their operations – starting small and using it to provide value to the organisation first, then to grower members by promoting good news stories and opportunities. Grower groups emphasised the importance of communicating to growers the robustness of the VAS security protocols.

> *'... having farmers have the trust to give data to us or to anybody. I guess there's been a lot of problems with misuse of data and so I guess security is probably the main thing. So it's really building trust with farmers that we can manage their data appropriately and for their good rather than for any other purpose.' GG8*

CONCERNS

- ## Context/interpretation

Participants raised the issue of how the data may be interpreted if it is available on a large online platform.

> *'There's also some concern about data being taken out of context, which can be an issue when we're talking about funding and government departments deciding from a central office somewhere or other organisations deciding from a central office somewhere, on the level of funding that they're giving to a certain area based on generic trends without having specialist knowledge of the region.' GG10*

They stressed the importance of data being looked in context and with an understanding of the broader influences on how it was collected, for what purpose, and the local conditions that underpin that data. The importance of experts with local knowledge to interpret the data should not be overlooked and there was concern that if the data is available without having to contact the local data provider it may be misunderstood. As well as potential policy and funding issues, the increased ability for lobby groups to use the data against growers was raised as a concern. In Queensland, the issue of increasing government regulation based largely on soils data contributes to a reluctance for growers to share data.

- ## Resources: time, skills, people

While the VAS project represents an opportunity to increase grower group data management skills, there was concern that they might not have the capacity and time to do it properly. All groups recognised that it will take considerable time to organise and format their data and many were unsure how much time it would take to get it to a useable point. They were also looking for reassurance of the longevity of the project – that it is long term project that is worth spending time and energy on now.

Questions were raised about the skills set within the organisation and how they would increase their skills in order to use the VAS portal competently and usefully.

> *'There's great value in it but we haven't got a lot of skills in the data space so making the most of the data or even identifying what the good bits in the data are, or collecting the data in the right way in the first place sometimes is an issue for us.' GG14*

Despite these reservations about their own skills, there was a general openness to the challenge due to the support and backup of the VAS project team and partners. An issue for most groups is access to skilled personnel. Being based in regional and remote Australia, the low population numbers mean that it is often difficult to find staff even if funds are available.

- ## Financial Value

One interviewee talked about the potential for growers to be concerned about the financial value of the data to the landholder or the organisation and that sharing it for free might not be in their best interest. Although it was not raised explicitly in other interviews, it is an interesting question (and related to the new Soil CRC project '*Activating financial markets to reward soil stewardship.')* and worth exploring directly with other participants in the VAS project.

CASE STUDY #1: Riverine Plains Inc.

- Riverine Plains Inc. (RPI) is an independent farming systems group dedicated to improving the productivity of broad acre farming systems in north-east Victoria and southern New South Wales. RPI covers a diamond shaped area running from Nagambie in the south to Wagga Wagga in the north, Jerilderie in the west to Wodonga in the east. RPI members include over 300 grain and mixed farming businesses in the region, specialises in farmer-driven research and extension, and is guided by their motto of *"Farmers Inspiring Farmers"*.
- We met with Jane and Cassie in June 2019 at their office in Mulwala, on the border of NSW and Victoria. Both work with Riverine Plains part-time and are involved in a number of collaborative research projects in addition to member focused activities. They described the current growing situation in the Riverine Plains region as average – not a crisis or a boom – across a wide range of soils. They were very aware of the power of data, and said that while RPI members are well-educated (many hold tertiary agronomy qualifications) and collect a lot of data, much of this data is not downloaded.
- The discussion included:
  - data sharing – members trust RPI, but are wary of external organisations, particularly corporate companies.
  - data management – the need for reporting standards and access
  - knowledge transfer – between staff, particularly when staff leave
  - trust – from a range of perspectives, including data collection methods, such as a distrust of John Deere data collection
  - time – everyone is short on time and data management and input requires time; the value of viewing collecting and analysing data over time.
  - VAS could be useful for providing evidence when applying for grants

Jane and Cassie from RPI (centre) with Andrew and Pete from CeRDI

"If you look at a very small group like Riv Plains with only a small number of staff and we all work well together and we know what each other is doing, but we're all collecting soil samples through the different projects that we're part of. And they're all getting processed and then a key thing is that we always publish the results in our trial book because that's our key way of archiving and permanent acknowledgement. But beyond that there has been no requirement to maintain a standard of results. And as much as everything goes onto our server into the actual data store there - I know what I've done with my sample sets and Jane knows what she's done with her sample sets - but then if I leave or if Jane leaves, or something happens, then what?"

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CASE STUDY #2: Central West Farming Systems

- Central West Farming Systems (CWFS) is an independent, not-for-profit, farmer driven organisation. CWFS is based in Condobolin and has more than 300 members spread over 14 million hectares in central western NSW. The region is a low-rainfall area with mixed farming and has been in severe drought for more than three years. CWFS run 12 trial sites, conduct extension activities, and have many partnerships aimed to benefit growers, industry and regional communities.
- We met Diana (CEO) and Helen (Trials Agronomist) at the CWFS office in the old research station building just outside Condobolin in late November. It was hot and dry, with the wind blowing red dust across the landscape. Despite not having enough rain to grow crops in the region for several years, they seem to have steady program of trials and extension activities to support farmers and increase sustainability.
- The discussion included:
  - data security – making sure data is adequately protected and accessed
  - trust between farmers and CWFS with data, but caution with companies and government bodies.
  - VAS could assist funding applications by provide evidence
  - difficulty in managing data from different projects over time
  - VAS will create the ability to see trends and collate data so it can provide answers to problems
  - important to acknowledge who has put in the work to create and provide the raw data.
  - importance of interpretation – it needs to be read in context (season, site, history, etc.)

Helen and Diana from CWFS (left) with Amie and Pete from CeRDI

"Finding more information about collecting data on soils is really important for our farmers. And I think that the more information and knowledge they have on what's happening in their own soils on their properties will give them greater decision making tools to make better decisions, become more profitable, and have more sustainability in their farms."

"It will enable us to be able to see trends in our soils and also have justification for applying for funding grants. Or maybe even some potential improvements that the growers in the district have made and we want to find out exactly what's going on."

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CASE STUDY #3: MacKillop Farm Management Group

- MacKillop Farm Management Group (MFGM) is based in Naracoorte and services the south east of South Australia and western Victoria, from Casterton and Edenhope to Mount Gambier, Keith and across to the Limestone coast. The group has approximately 360 members, 90% of whom are mixed farmers. MFMG develops and delivers innovative and sustainable farming practices through collaborative research, communication and extension for the benefit of members and the agricultural industry.
- We met with CEO Meg, and project managers Claire and Mel (PIRSA), at the magnificent Struan House near Naracoorte in November 2019. MFGM works closely with PIRSA and SARDI and have close links with agronomists, industry and researchers. They described an optimism in the region generated by good growing seasons and an increase in children of farming families coming home to take over farm management. It was also noted that favourable conditions mean there is less uptake of new technology and less communication between growers because things are growing well and their businesses are not strained, therefore there is little need to change practices.
- The discussion included:
  - better data management is a large part of the value of VAS
  - VAS is a good resource for applying for grants
  - concern about people using data but not understanding the context – that decision makers higher up will make decisions based on data without calling experts to interpret it
  - value in connecting data and results from individual projects - e.g. historical with current
  - concerns about privacy, particularly companies sharing client data. Is it their data to share if client has paid for it?

Claire, Meg and Mel from MFMG (centre front and right) with Pete, Andrew and Amie from CeRDI

"We're probably participating because it will give us some options for maintaining data and making sure that it's useable into the future. […] I think long term it's going to probably give us the ability to identify some trends that are happening in the region and it will help us quantify the impact of some of the research and extension activities that we do. And that, from an investment point of view for future research that's done in our region, is really useful. It give us something that we can quantify and put on the table as evidence.
Short term, I think it probably gives us a really good option for getting some of our data organised and into a more useable form than it's currently in."

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PROJECT MANAGEMENT LEARNINGS

- Good communication is imperative!

  When participants were asked what about project management and how the VAS team could make their involvement easy, the response was unanimous – good communication. They would like regular, clear and open communication from the project team that keeps them informed of project progress, gives clear instructions, and seeks their input and feedback during the decision making process.

  Throughout the meetings all grower groups demonstrated a desire to be acknowledged for their individual situation and characteristics – every group is different – and for their on-ground expertise to be respected. Participants expressed a desire for tailored communication that shows that the VAS team have taken the time to understand each grower group and how VAS can assist them. All grower groups explicitly mentioned how much they valued the face-to-face meetings with the VAS team, as a way to get to know each other, build trust and openness, and to create a sense of collaboration and enthusiasm for the project.

  Growers groups are looking for support and knowledge as they learn to manage data, which can be provided by the VAS team being available to discuss issues and answer questions, and assist with things like data formatting when required. Many participants said it is extremely helpful to be able to talk to someone when the need arises, as each group has its own needs and issues.

  On a practical level, the following communication methods and were described as useful: emails (short and concise), phone calls (especially with someone who knows the group's individual situation), social media, and shared drive for document sharing. As for newsletters, one participant summed it up neatly: *'I don't read newsletters unless something grabs me in headline'*. Another mentioned that they are all busy therefore prompts are useful: *'I get pretty busy – don't be afraid to bang the door down – the squeaky wheel gets the oil!'*

  With regard to data contribution, grower groups would like clear instructions for deadlines, outcomes and goals – the best format for the data delivery, i.e. a template, due dates, and the best person to contact with data questions.

  > *'Having processes and protocols in place so that we know from the start that we've got X, Y, Z job to do and to do X job, you need to do these three things; to do Y, you need to do these four things; and so on. That's easy for me because it means that if there's something particular that I can hand on to one of my other staff members to do, then that frees up my time. And it just gives me a checklist to make sure that I've done everything that I need to do.' GG10*

KEY THEMES

- Value Proposition
  - improve data management and skills
  - data collation for increased efficiency, knowledge and understanding
  - data as evidence for decisions and funding applications and social responsibility
  - engagement with grower group members via visualisation
  - collaboration and connection with the wider agricultural industry, government and research sector
- Concerns
  - data sharing – privacy, security, trust, context
  - resources – time, skills, people
  - appropriate respect for growers, project managers, and local researchers for time, effort and expertise that underpins the data they provide
- Good communication is the key to good collaboration
  - regular, relevant communication
  - clear instructions
  - be available to answer questions and give assistance when required
  - seek partner input and feedback
- Next steps
  - incorporate the findings of this report into project design and processes
  - continue to collect and analyse social data as the project progresses
  - maintain communication with partners

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VISUALISING AUSTRALASIA'S SOILS

A SOIL CRC INTEROPERABLE SPATIAL KNOWLEDGE SYSTEM

Manaaki Whenua Landcare Research

CeRDI | Federation University • Australia

University of Tasmania Australia

University of Southern Queensland

LiEBE Group – Working together in Agriculture

SFS – Southern Farming Systems

Holbrook Landcare Network

wantfa

HCPSL – Herbert Cane Productivity Services Ltd.

Burdekin Productivity Services – Productivity, Profitability, Sustainability

BCG – Shared Solutions

RiverinePlains

MFMG – www.mackillopgroup.com.au

Gillamii Centre – Sustainable Agriculture in Practice

CWFS – Central West Farming Systems Inc.

LANDMARK

North Central Catchment Management Authority – Connecting Rivers, Landscapes, People

Wimmera CMA

Mallee Sustainable Farming

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