CottonInfo Extension Activity Report

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: **CSD2001**

CSD:

Project Title: **Soil health workshops – Upper Lachlan and Upper Namoi**

Project Commencement Date: **1/10/19** **Project Completion Date:** **30/6/20**

Part 2 – Contact Details

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Part 3 – Final Report

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

Background: Increasing evidence of constrained root growth below 60cm has meant increased focus on soil and sub-soil health for productive plant growth. Improving soil health is also a key objective of the industry sustainability targets.

Objectives

2. List the project objectives (from the application) and the extent to which these have been achieved.

This activity will deliver two soil health workshops at Forbes and Mullaley that build on the rooting depth projects (UNE1603 and UNE2001 as per Oliver Knox) with a key focus on maintaining and building soil carbon to improve the industry environmental footprint.

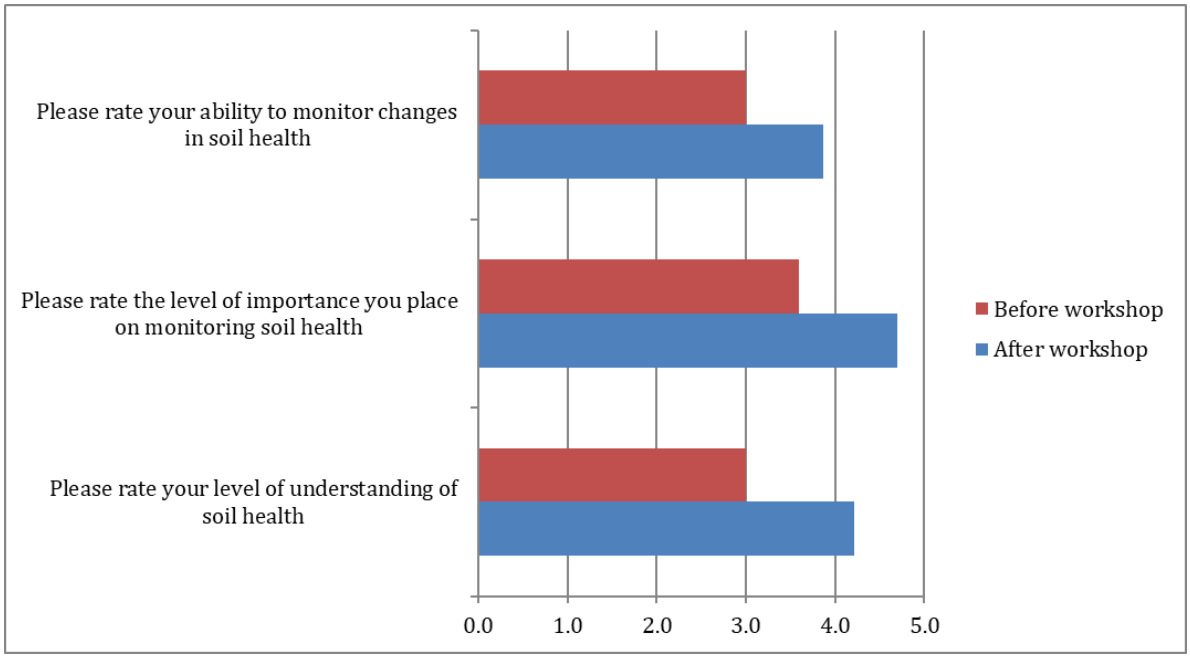
The workshops will be focused around an on-farm soil pit to provide a practical focus for discussing issues around soil health management. Soil tests will be conducted prior to the workshops to provide background data.

Building on the interest of the CCA soil health workshops, CottonInfo will run two workshops in areas previously not covered with the objectives of:

- Improved grower and consultant awareness of soil health and its importance.
- Demonstration of practical techniques to assess soil health.
- Options to address soil health related issues and to build soil health

The Upper Lachlan workshop was held near Forbes while the Upper Namoi workshop near Mullaley was cancelled due to COVID 19 restrictions.

The Forbes workshop had a total of 33 people present of which 55% identified as growers, 23% as consultants and the remaining 22% as industry, presenters and others. 14 surveys were returned which represented as 50% growers, 21% consultants, 14% retailers and 14% industry.
Survey results indicated that participant understanding of soil health issues improved from a score of 3/5 before workshop to 4.2/5 after the workshop and the rated importance of soil health changed from 3.6 to 4.7 (on scale of 5). These indicate that awareness and importance of soil health was improved by the workshop. Participants rated their ability to monitor soil health before the workshop at 3/5 before the workshop and 3.88/5 after the workshop. This suggests that the practical techniques demonstrated during the workshop did assist some in their abilities to assess soil health. 38% indicated no improvement in this aspect from the workshop suggesting that a review of how the practical techniques are delivered may be beneficial.



Participant survey responses showed that minimum tillage and crop rotation were currently the most widely used options that are considered beneficial to soil health. Responses to the question of "What will you do differently as a result of today's workshop?" fell predominantly towards the use of cover crops and manures/organic matter.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related projects.

The format of the Forbes workshop was a series of presentations (powerpoint, whiteboard, butchers paper props) in the host grower shed followed by a field inspection of a local trial of a biodegradable film used in a cotton crop finishing with soil pit demonstrations/inspections at two differing sites within a field.
Some attendees left as the group moved from shed to field. Follow up comments obtained indicate that it may be worth trialling running the soil pits first or shortening the workshop duration. The justification for the used format is to work through the theory and collected site data (ie soil tests, paddock history) first, before going into the field to see how that data reflects in the physical observation. The shed based component allows the presenters to communicate some more complex concepts with the use of aids and examples. Finishing in the field has a more relaxed social atmosphere which, at times, assistd in discussion of topics.

Survey participation was low (under 50% of total numbers). Initially, a paper survey form at the workshop was used, however an electronic survey was sent after the event to attendees to gather some more responses. Alternative survey methods at the event (ie. electronic, QR code activated) may help achieve a greater response. Incorporating these into the body of the workshop might gain better responses (ie ask survey question during the presentation segment of that topic – while people are thinking about the topic). It was also noted that some questions were only partially answered or not answered at all. Crafting of survey questions may have contributed to some of varied response rates. In attempting to gauge where attendees rated themselves in knowledge, attitude, skills and ability on a topic, the questions hold a degree of "sameness" perhaps leading to confusion or a feeling of duplication. On this point, the survey questions used have been given to Ben Simpson, monitoring and evaluation manager at CRDC, for re-wording to try and improve outcomes from the survey. It is the writer's intention to try and integrate survey questions into future workshop formats should the technology be available and event circumstances permit their use.

Outcomes

4. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

The project outputs included the workshop, handout material from the presenters, including the Food and Agriculture Organisation of the United nations (FAO) Visual Soil assessment guide used with the soil pit demonstration of conducting this assessment. The survey results also provide an output indicator of the success of the workshop in achieving the stated outcomes, along with comments and suggestions that help shape future workshops in their format and content.
The improvement of attendee's ability to assess soil health due to the workshop was rated as only minor overall. However, a number of respondents did not answer this question (8 of 14 answered) suggesting confusion or that this is not something the respondent is required to do (so answer becomes irrelevant).
The strong response rate to consideration of the use of cover crops and manure/organic matter to help manage soil health suggests these are two practical options that attendees took away for the workshop.

5. Please report on any:-

a) Feedback forms used and what the results were
b) The highlights for participants or key learnings achieved
c) The number of people participating and any comments on level of participation

A summary of the survey results along with observations and suggestions generating from the day and the survey are accompanying this report.
Butchers paper was used to capture attendees' concept of soil health in 1 or 2 words. It was also used to record questions that arose during the sessions along with brief answers. Photographs of these sheets were taken and retained for evaluation of workshop.
Questions a) and c) have been briefly covered earlier in this report with more detail available in the survey summary.
For question c), the nominated highlights focused mostly on two presentations (Sub soil constraints – Brendan Griffiths and soil health – Oliver Knox) and the soil pit demonstrations. Responses to "barriers to the implementation of measures to improve soil health" fell into two main categories, drought and cost.
Key learnings for attendees were improved understanding of what defines a healthy soil, how to field assess a soil's health, techniques to manage soil health and exposure to the use of advanced techniques to identify soil constraints (Precision Cropping Technologies had been working with host grower and consultant to identify soil constraints).
A message in this for research and extension is the need to put some economic assessment around strategies to improve soil health to outline potential cost:benefits of a strategy.

Conclusion

6. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

The workshops assist to raise awareness of soil health with growers, consultants and industry along with providing information and techniques for monitoring and managing soil health. Assessing soil health via the FAO method demonstrated at the workshops is a simple technique that growers can use. Options to aid in managing soil health were presented and growers need to evaluate and test those that might work for their farming system.
The two take home messages that the survey responses highlighted were:

- Increase soil organic matter
- Target ground cover in place of bare earth (fallow)

Improved awareness, monitoring and implementation of management techniques for soil health has benefits for the cotton industry on many levels and integrates into other facets of cotton production. Improved soil health will manifest in the forms of improved physical, chemical and biological components of a soil and their interaction with each other and the crops grown. The role of soils as the foundational structure for our cropping systems means its "health" has potential to impact pest and disease presence and severity, nutritional requirements of crops, water use, productivity and sustainability of crops and systems, and contribute to the health of the planet via its role in the carbon cycle. More specifically, the take home messages of increased soil OM and ground cover will benefit the capture, storage and efficient use of water, possibly the industry's most limiting resource.
From this flows a multitude of benefits that ultimately can enhance productivity and sustainability of a production system.
A target impact of the workshops and associated promotions is to lift the use cover crops in cotton production systems from 1% to 5% in irrigated systems and from 10% to 15% in dryland systems as reported in the next grower survey.

Extension Opportunities

7. Detail a plan for the activities or other steps that may be taken:

(a) To tell other CGAs/growers/regions about your project.

(b) To keep in touch with participants.
(c) For future projects.

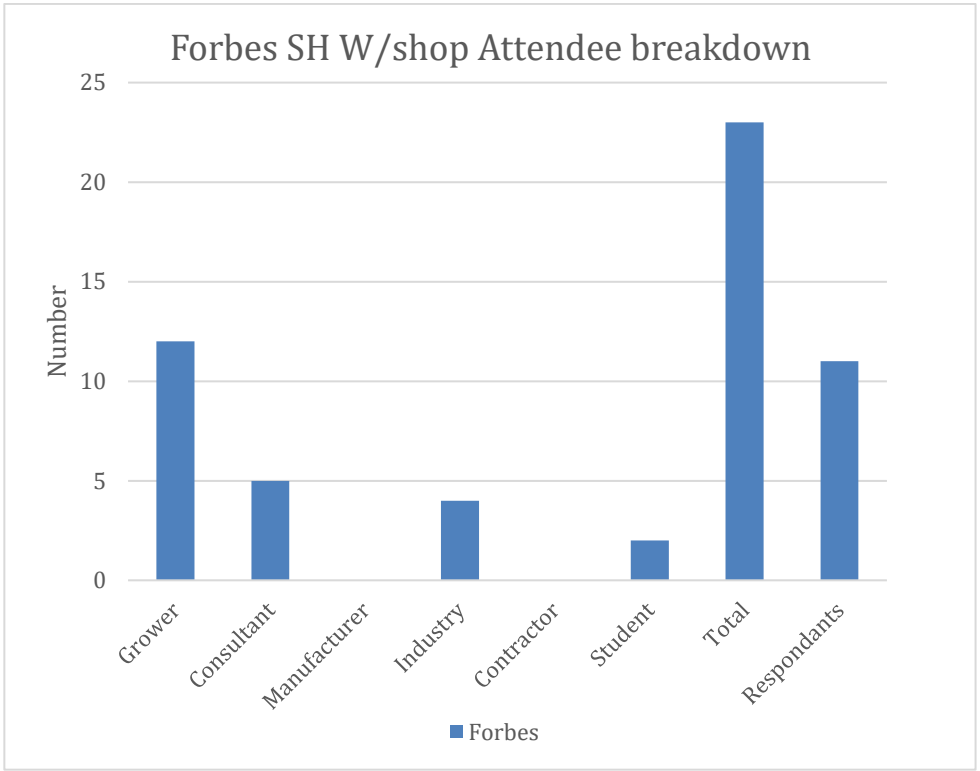
The soil health workshops have been promoted via a range of channels including email campaigns and notifications, feature articles in newsletters produced by the CottonInfo team and industry magazines such as Spotlight. Case studies featuring growers, a soil health section on the CottonInfo website and the "Soil Your Undies" program are all aimed at improving grower awareness and adoption of techniques to manage and improve soil health.
The results of "buried undies" from the Soil Your Undies program are photographed and distributed on social media platforms such as Twitter using the handle #soilyourundies. A recent addition to this campaign is the Soil Your Undies map where results can be submitted for display on a map and compared to results in other areas.
Future soil health workshops are currently on hold due to COVID 19 restrictions and budget considerations. The soil testing for a workshop at Mullaley was completed prior to the workshop cancellation due to COVID. That site is likely to be the next soil health workshop once restrictions ease and funding allocated.
Soil health technical lead, Oliver Knox has written articles on soil health for the Spotlight magazine (Understanding the real nature of Long Fallow Disorder – Winter 2020 edition) which also features as a Blog on the Cottoninfo website.

Forbes Soil Health Workshop Evaluation

Summary:

- 22 registered attendees plus 11 organizers and presenters for a total of 33.
- 55% of attendees were growers, 23% consultants and the balance of 12% were Industry or other.
- 14 surveys were returned, 50% classified themselves as growers, 21% as consultants, 14% as retailers and 14% as industry.
- The topics, the level of information, and the standard of presentations were considered good by attendees.
- Soil structure and compaction were rated the biggest soil health issues on grower farms, with AM (arbuscular mycorrhiza) and soil pathogen levels rated the lowest of the presented issues.
- Questions targeted at analyzing respondent knowledge, attitude, skill and ability on soil health were inconsistently answered (suggests these need to be reviewed to capture desired information). However, respondent rating of their understanding, ability and importance rating on soil health issues were increased by attending the workshop.
- Minimum tillage and crop rotation were the two most implemented measures to improve soil health.
- Cover cropping and use of organics were practices most likely to be implemented as a result of the workshop.
- Cost and drought were considered the greatest impediments to implementing soil health measures
- Research and development needs stated were diverse with more consulting needed to identify key areas.

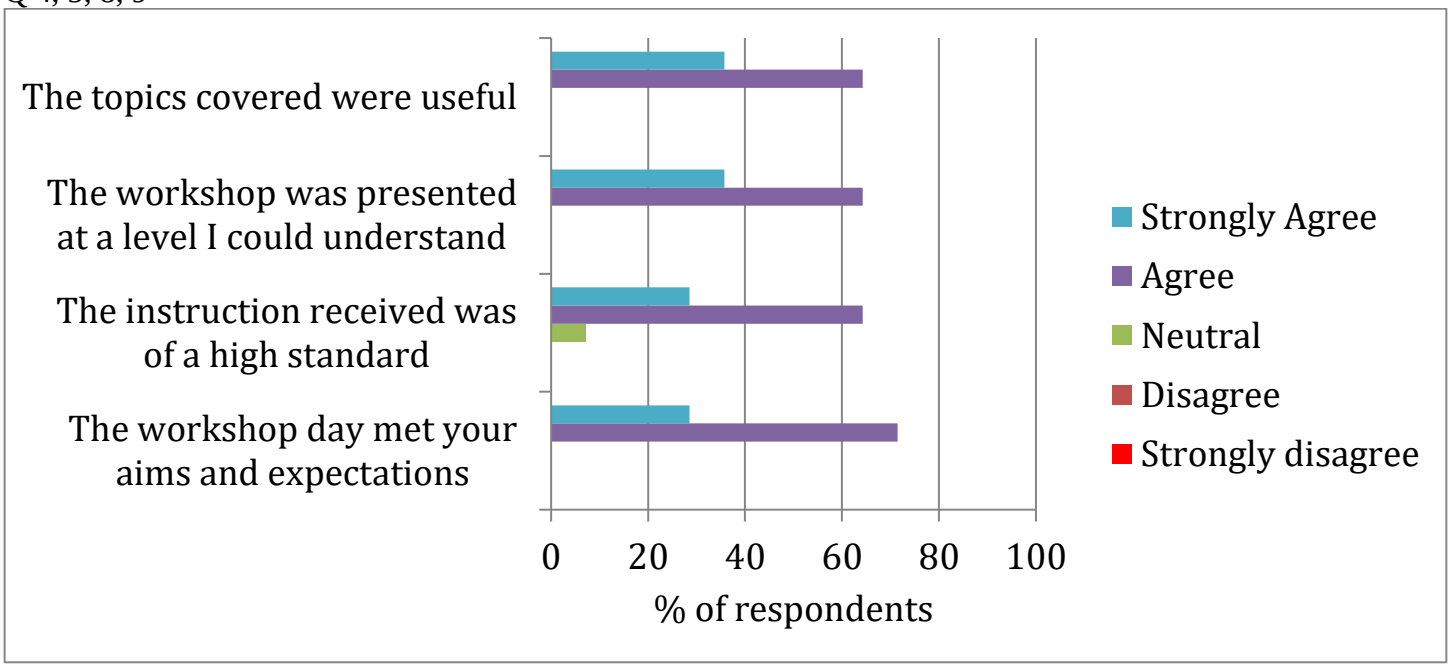
Q1



In one case an attendee rated themselves as a consultant and industry – changed to just industry for these results. One attendee did not nominate a category.

Forbes Soil Health Workshop Evaluation

Q 4, 5, 8, 9



Q 6, 7

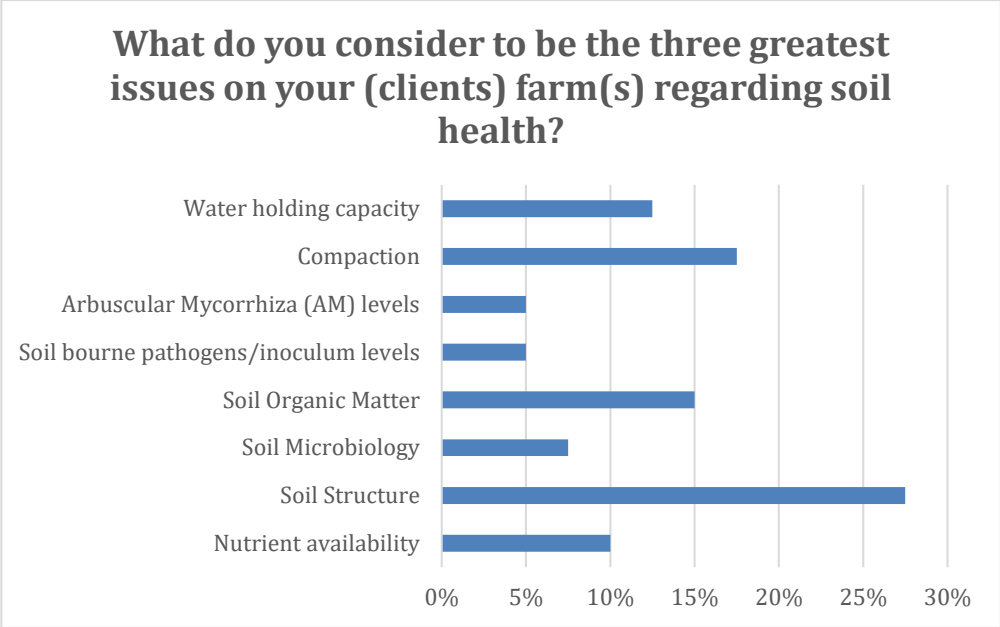
	Too slow	About right	Too fast
The pace of delivery of information was	0%	100%	0%
The amount of information was	0%	100%	0%

Q10

How could we have improved the workshop to be more useful for you?
Chairs, overall good though. Good mix of practical skills and research
More info / research on soil amelioration
Great workshop!

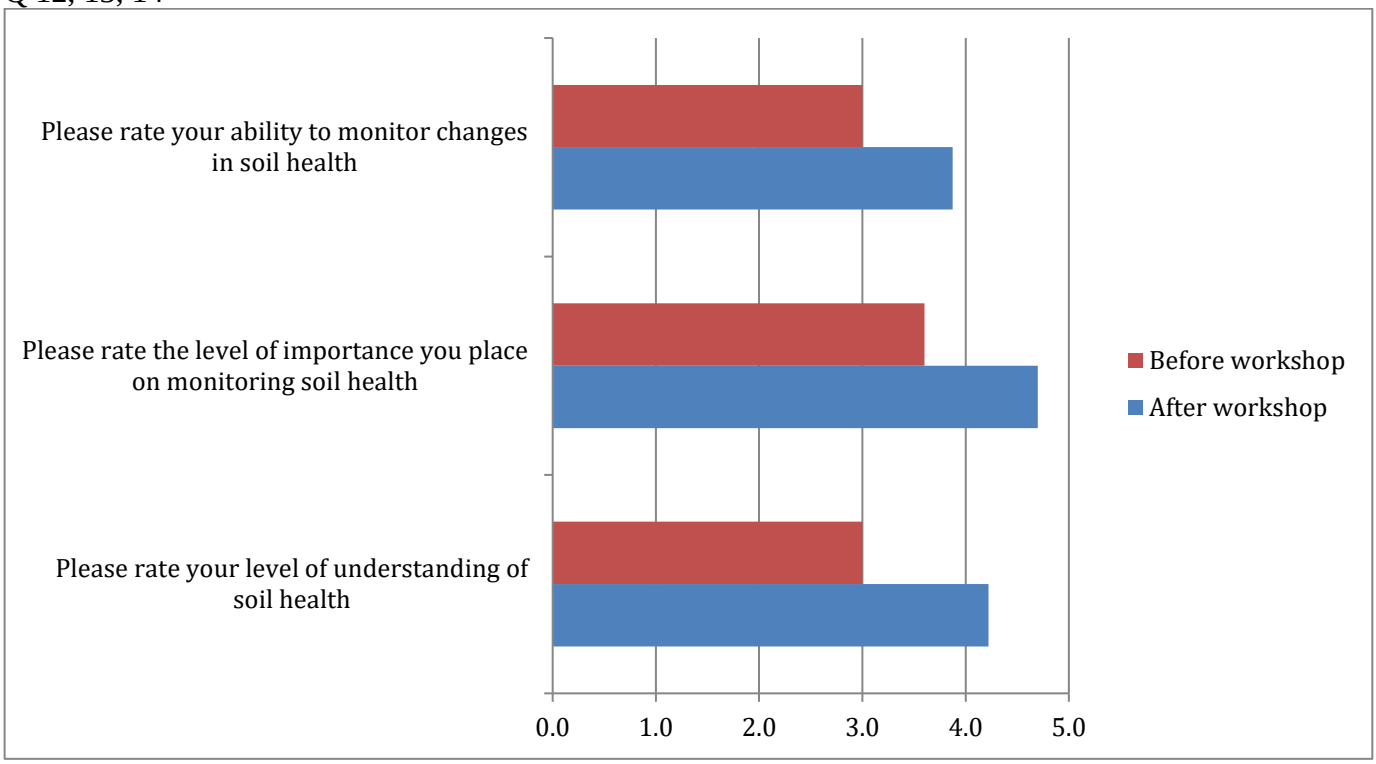
Q11

Forbes Soil Health Workshop Evaluation

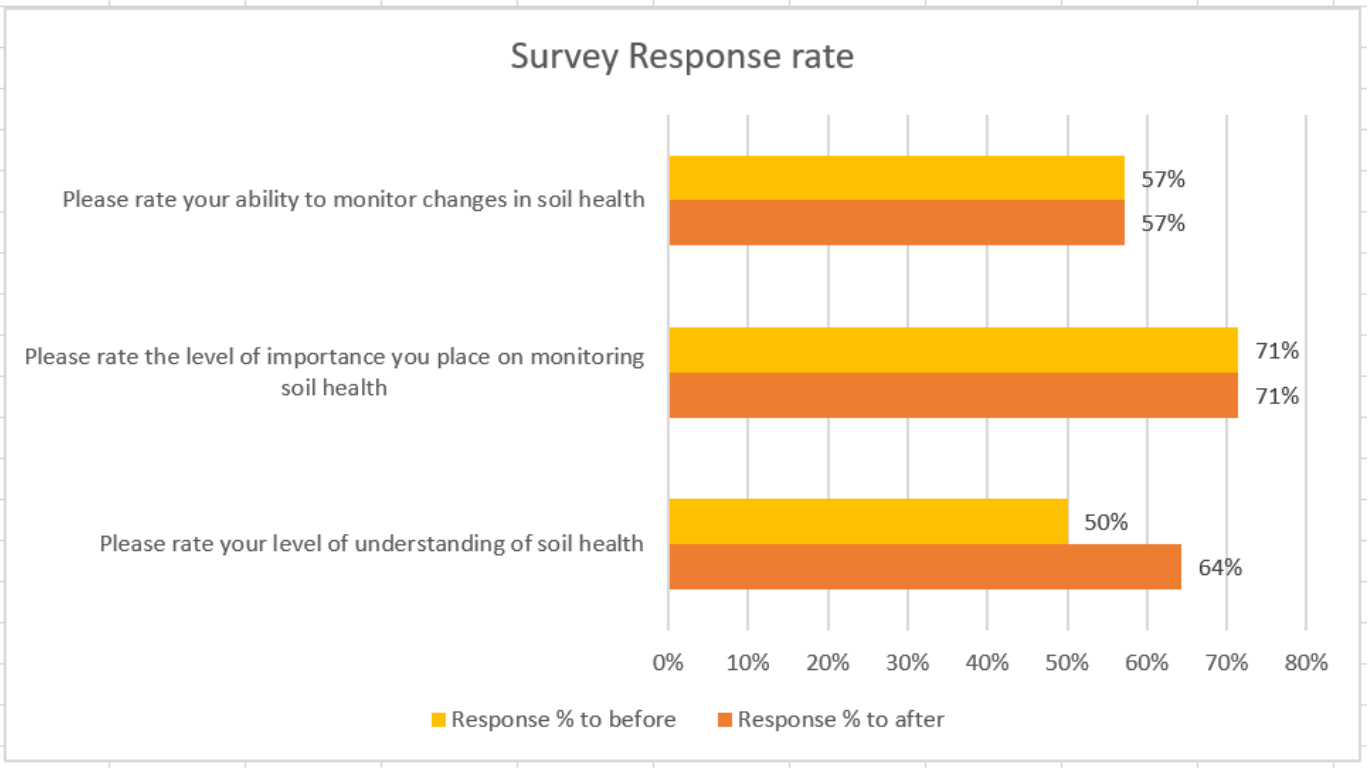


Forbes Soil Health Workshop Evaluation

Q 12, 13, 14

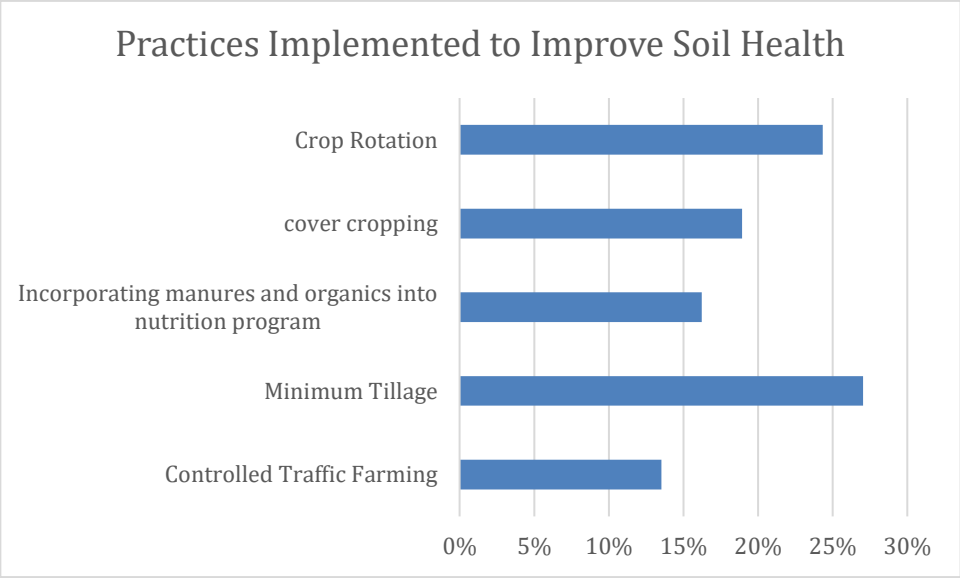


Response rate to the above questions was varied, as shown below, with a number of respondents not answering the questions and in some cases answering only part of a question.



Forbes Soil Health Workshop Evaluation

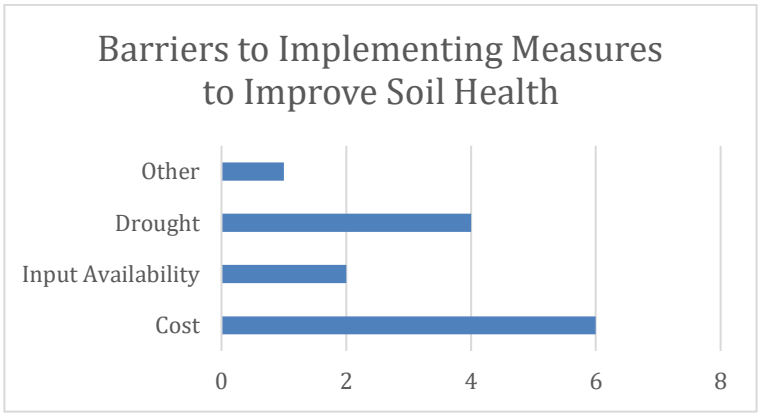
Q 15



Q16

Will you do anything differently as a result of what you've learnt today?
Cover cropping and look at manures
Cover crop and controlled traffic
Tracking salinity and elevation more closely
more organic matter
Probably start some cover crop
yes
Cover cropping and look at manures
Implement more PA (precision ag?) to measure constraints
Spreading OM (chook manure)
Increase focus on soil health
plant wheat instead of long fallow

Q17



Responses largely fell into three categories as represented above.

Forbes Soil Health Workshop Evaluation

Q18

What are your research and development needs for Soil Health
Flooding and BRR in the south particularly the temperatures requirements
Soil OM, WHC and compaction
long term effects of applying lime/gypsum, improving WHC of soils
Measuring biological activity; rotational regimes to profit from and ……. for; zonal management
Maintaining and improving soil health
Practical demonstrations of soil biology

Q19

What have been the highlights of today
The disease talk was fantastic. Give that man a raise. Was good to hear a bit of discussion from the crowd about what they'd tried, particularly from the locals
Integration across research areas and impact on soil health
Brendan Griffiths preso
Great take home messages about improving soil health
Pits; spatial data use
Quality of presenters
Brendan and Olly both v good presenters with good info
Soil Pit
Ollie - soil pits

Notes:

- Two respondents only completed the first half of the survey. One appeared to miss questions on reverse side of page and other got a half-printed survey (ie was missing questions on reverse side of page).
- Six respondents were captured via online survey which lacked the question on "cotton area under management" while balance were written responses from survey handed out at event.