

# Agenda papers for Meeting 7 of the Australian Soil Network (formally Soil RD&E Implementation Committee)

**Location** Video conference using WebEx (link sent by Hamish Cresswell)

**Date** Thursday 25th August 2016

## **Attendees**

Georgina Kelly	New South Wales Department of Primary Industries (Chair)
Neil McKenzie	CSIRO Agriculture and Food, Canberra
Hamish Cresswell	CSIRO Agriculture and Food, Canberra
Jennifer Alexander	Executive Officer, Bendigo
Alex McBratney	The University of Sydney
Ian Anderson	University of Western Sydney, Richmond
Michael Crawford	Department of Economic Development, Jobs, Transport & Resources, Bendigo
Jason Hill	Department of Land Resource Management, Darwin
Paul Lawrence	Department of Science, Information Technology, Innovation and the Arts, Brisbane
Allan Williams	Cotton Research and Development Corporation, Narrabri
Cameron Allan	Meat and Livestock Australia, North Sydney
Michele Barson	Department of Agriculture and Water Resources, Canberra
Felice Driver	Sugar Research Australia, Brisbane
Cathy Phelps	Dairy Australia, Melbourne
Brenda Kranz	Horticulture Innovation Australia, Sydney
Warwick Dougherty	New South Wales Department of Primary Industries, Camden
Sharon Harvey	Wine Australia, Adelaide
Karen Holmes	Department of Agriculture and Food Western Australia, Perth
Neal Menzies	University of Queensland, St Lucia

## **Apologies**

Jim Cox (SARDI), Jan Edwards (GRDC), Chris Grose and Peter Voller (DPIPWE), General Jeffery (National Advocate for Soil Health), RIRDC representative

## Agenda

Time	Item	Paper
9.00	Join video conference via WebEx link (and/or dial in if low band width) to allow time to connect and resolve connection issues	
<b>9.30</b>	<b>~ Welcome ~</b>	
9.35	ITEM 7.1: Minutes of previous meeting	
9.45	ITEM 7.2: Working Group and Standing Committees- process	
10.15	ITEM 7.3: Working Group and Standing Committees- description and status	
<b>11.15</b>	<b>~ 5 minute break ~</b>	
11.20	ITEM 7.4: Prospectus development (verbal update)	
11.50	ITEM 7.5: Next annual forum– ideas/proposals for next forum, seeking volunteers for working group	
<b>12.20</b>	<b>~ Lunch ~</b>	
12.50	ITEM 7.6: Member (jurisdiction) and Working Group updates. Up to 3 minute verbal update for emerging issues.	
1.20	ITEM 7.7: Discussion re soil CRCs - update from Malcolm Buckby, Ravi Naidu	
1.50	ITEM 7.8: Committee discussion on CRCs following the Sydney meeting	
<b>2.20</b>	<b>~ 5 minute break ~</b>	
2.25	ITEM 7.9: Financial report	
2.40	ITEM 7.10: Other business	
<b>3.00</b>	<b>~ Close ~</b>	

Australian Soil Network	Meeting Number: 7
	Location: Videoconference
	Date: 25 <sup>th</sup> August 2016
AGENDA Paper	ITEM 7.1
<b>Minutes of last meeting and correspondence</b>	
<b>Background</b>	
The draft minutes of Meeting 6 of the Soil RD&E Implementation Committee are presented for review and endorsement (Attachment 1).	
<b>Key issues</b>	
None identified.	
<b>Required action</b>	
For review and endorsement.	
<b>Resource implications</b>	
None	
<b>Preparation and consultation</b>	
Soil RD&E Secretariat.	
<b>Attachments</b>	
DRAFT Minutes of Meeting 6 of the Soil RD&E Implementation Committee (separate document).	

Attachment 1: Minutes of Meeting 6 of the Soil RD&E Implementation Committee

## DRAFT Minutes of meeting 6 of the Soil RD&E Implementation Committee

Location: University of Sydney, Level 4, Biomedical Building, 1 Central Ave, Eveleigh.

Date: Tuesday 10<sup>th</sup> May 2016

Attendees: Georgina Kelly (Chair), Neil McKenzie, Hamish Cresswell, Jennifer Alexander, Jan Edwards, Ian Anderson, Michele Barson, Paul Lawrence, Felice Driver, Cathy Phelps, Peter Voller, Cameron Allan, Brenda Kranz, Alex McBratney, Vicki Woodburn, Jason Hill, Michael Crawford, Jim Cox, Karen Holmes, Neal Menzies, General Jeffery

Apologies: Allan Williams, Warwick Dougherty, Sharon Harvey

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
6.1	Minutes of last meeting and correspondence	<p>Refer to agenda paper 6.1 and the minutes of the last meeting.</p> <p>The minutes of the last meeting were endorsed except for item a minor correction to 5.2. Moved by Michele Barson, seconded by Felice Driver.</p> <p>The executive committee have been monitoring the rolling action list.</p>	<p>Change minutes of meeting item 5.2 from Department of Agriculture will have some new mapping products to share with the Committee to Department of Agriculture and Water Resources are commissioning some new mapping products and will share them with the Committee in due course.</p> <p>The action list will be circulated out of session for information and or comment</p>	<p>Executive Officer</p> <p>Executive Officer</p>	<p>May</p> <p>May</p>
6.2	Member updates and member-in-focus	<p>Refer to agenda paper 6.2.</p> <p>Members provided written updates that were circulated in the meeting papers (NSW, Vic., WA, Tas., CSIRO, RIRDC) and/or verbal updates to the committee.</p>			

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
		<p>Neal Menzies was welcomed as the Australian Council of Deans of Agriculture representative.</p> <p>Two members provided a more detailed account of their activities.</p> <p>Jan Edwards provided an overview of GRDC's funding model and investment process.</p> <p>Alex McBratney provided an overview of the University of Sydney's' research capacity and soil research topic areas. It was noted by Neil McKenzie that the research delivered by Sydney University is internationally renowned. The 2015 ARC ERA result for 0503 Soil Sciences mentioned in the talk can be found here: <a href="http://www.arc.gov.au/era-outcomes-2015#FoR/0503">http://www.arc.gov.au/era-outcomes-2015#FoR/0503</a></p>	<p>Clarification will be provided regarding the four ACDA members</p>	<p>Neal Menzies</p>	<p>Next meeting</p>
<p>6.3</p>	<p>Strategy Update: Planning Forum, Outlook 2016, R&amp;I Committee</p>	<p>Agenda paper 6.3 provided as background.</p> <p>Outlook provided a valuable opportunity to calibrate how soil issues are viewed within the leadership levels of government and industry. It also provided insight into how other areas connect and communicate with policy at this level, with some, such as the Bureau of Meteorology, providing an excellent example. All the Outlook presentations are online and the talks by Mick Keogh on digital agriculture and Neal Menzies on tertiary education are worth viewing in particular.</p>			

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
		<p>As a result of the presentation, the Soil RDE committee have been invited to brief assistant Minister Pitt on soil RDE and broader issues.</p> <p>It was proposed that the Soil RDE Strategy presents on a regular basis at the ABARES Outlook Conference to report on the status of our soil resource, perhaps to complement the industry outlooks. For example we could provide an update on one of four to five key issues each year (e.g. soil acidification). The new National Landcare Program could provide input along with State agency activity. This proposal was not fully endorsed by the Committee so it was deferred for further consideration.</p> <p>The R&amp;I Committee meeting gave a valuable understanding of how other strategies are progressing.</p>	<p>Members should communicate their views re priorities for discussion with the Assist. Minister to the secretariat.</p> <p>Neil will circulate a draft briefing for Minister Pitt to members of the committee for comment.</p> <p>Members should consider the proposal more fully and indicate if they support continued involvement in the Outlook Conference and suggest options for involvement and mode of reporting. The Secretariat will synthesise feedback into 2 or 3 options for continued engagement with Outlook.</p>	<p>All</p> <p>Neil McKenzie</p> <p>All</p>	<p>End of June, meeting dependant on federal election result</p> <p>Members reply to the secretariat by end of July 2016.</p>
6.4	Updated capability audit	<p>Agenda paper 6.4 provided as background.</p> <p>A proposal was put to update the Soil RD&amp;E capability audit and alternative mechanisms were proposed to enable audit completion. The committee was asked to agree on its preferred course of action.</p> <p>The last capability audit was undertaken 5 years ago. The audit has been valuable as it identified core areas of strength in capability and capacity by subject area,</p>	<p>The Committee agreed to undertake a capability audit that considers FTE and investment or expenditure by field of research, with a survey of age structure. A motion to proceed was put by Michael, seconded by Cameron and supported by the committee.</p>	<p>Michele and Neil (co-lead), Michael, Alex, Brenda and</p>	<p>Progress report due next meeting</p>

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
		<p>organisation and investor. An update of the audit was discussed. The audit will assist in reviewing how well current expenditure aligns with our priorities, it will assist with identification of capacity gaps, provide a national snapshot on implementation, and provide information that will help underpin investment cases.</p>	<p>The committee deferred decision on the proposed mechanisms and elected to form a working group to further consider scope, design, and options/mechanisms for delivery. Collaboration with Soil Science Australia was suggested.</p>	Paul	
6.5	Prospectus for our five priorities and the CRC option	<p>Agenda paper 6.5 provided as background.</p> <p>It was proposed that the Committee agree and initiate a process to develop a prospectus for each of our 5 national Soil RD&amp;E priorities. In-principle agreement was sought for use of strategy funds (\$50k) for commissioning a consultancy for writing the prospectus. Formation of a Working Group was proposed to oversee and manage development of the prospectus.</p> <p>The prospectus is required to achieve order in the way investment occurs across the five key priorities, to clearly articulate the benefits of each priority, outline the scope of works, what is needed to achieve them and describe the mechanisms to deliver them.</p> <p>A member suggested to use consultants to review the work (Toss Gascoigne or Stuart Kells) but no funds were committed for this purpose.</p>	<p>There was in-principle support from the Committee for development of the prospectus but not on the commitment of strategy funds for this purpose. It was requested that a prospectus for one of the national priorities was drafted as an example 'blueprint' that could be considered by the Committee at a later meeting. It was decided/requested that a draft narrative for priority 3 be developed and circulated to the Committee for comment.</p>	Neil to coordinate	Next meeting

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
		<p>CRC reflection</p> <p>The University of Newcastle lead a recent CRC submission. The coordinators of the bid were encouraged by CSIRO, as lead agency, to engage with the IC and other parties in the development of the CRC proposal. An offer for the bid proponents to present to the IC was declined. There continues to be significant concern within the Committee of the Soil RD&amp;E community appearing fractured and uncoordinated due to CRC bid proposals being developed in isolation from major funders and providers and from the national Soil RD&amp;E framework process.</p> <p>While there has been significant progress in building collaboration as a result of the formation of the IC, it was recognised that a CRC suits some organisations more than others.</p>	<p>Western Sydney University will convene a discussion about a future CRC proposal. Members should make themselves known to Ian if they are interested in participating.</p>	All	Late May
6.6	Economic case for investment into Soil RD&E	<p>Agenda paper 6.6 provided as background.</p> <p>It was proposed that the Committee support preparation of an economic case for investment into Soil RD&amp;E, agree on a process for preparing the case, and provide in-principle agreement for the use of strategy funds (\$50k initially) for a consultancy to prepare the case.</p> <p>A strong economic case for investment is required to support the Prospectus for Soil RD&amp;E in Australia. However, information on costs and benefits and compelling analysis approaches aren't readily available.</p>	<p>The Committee resolved to take an expert committee approach to capture data and assumptions of the costs and benefits for two priorities as a starting point. Neil McKenzie to lead priority #3 and Neal Menzies to lead priority #1. Alex McBratney will provide input into the type of analysis.</p> <p>The Committee agreed to the use of Strategy funds to support external input into the process, if required, of up to \$5k per priority area (i.e. a maximum of \$10k).</p>	Neil McKenzie to lead priority #3, Neal Menzies to lead priority #1, input from Alex McBratney	Progress report due next meeting

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
				as required	
6.7	Building the soil information infrastructure	<p>Agenda paper 6.7 provided as background.</p> <p>It was proposed to develop and fund a project to develop the Stream 4 ASAP proposal with up to \$20k of Strategy funds allocated to support proposal development.</p> <p>A new generation of technologies is available to build the ICT infrastructure to ensure soil information is readily generated and accessible. This is integral to the Big Data revolution in agriculture and central to addressing key priority number three. The terms of reference for the project need to be developed, covering the scope and deliverables.</p> <p>The CRDC has submitted a Rural R&amp;D for profit bid around data governance and, if successful, this project could leverage against it.</p>	<p>Committee resolved to form a sub-group. Members of a working group will be identified and the membership circulated, for endorsement before project commencement.</p> <p>There was no agreement to spend any strategy funds on this proposal at this time.</p>	Hamish	June
6.8	Update from the National Advocate for Soil Health	<p>Agenda paper 6.8 provided as background.</p> <p>General Jeffery provided a verbal update and outlined his proposals for 'Fixing Paddock' and 'Fixing Policy' to restore and maintain landscapes that are fit for purpose.</p>			
6.9	Committee name change	<p>Agenda paper 6.8 provided as background.</p> <p>It was proposed that the National Soil RD&amp;E Implementation Committee adopt the new working name of 'Australian Soil Partnership'.</p> <p>A name change for the Committee was discussed with the working title 'Australian Soil Network' preferred over 'Australian Soil Partnership'.</p>	<p>The Committee supported the new working title of 'Australian Soil Network', which when used in 'banner style' will be worded: 'Australian Soil Network – implementing the National Soil RD&amp;E Strategy'.</p>		

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
6.10	Communication management	<p>Agenda paper 6.10 provided as background.</p> <p>The Committee was asked to agree a process for preparing a communications plan, allocate resources from the Soil RD&amp;E strategy budget for this purpose, and decide which suggested communication actions we should proceed with.</p> <p>The type and style of communication strategy required by the Committee was discussed.</p> <p>Proposal was made to establish a working group to develop the scope for the communications plan and develop a proposal for plan development.</p>	<p>Process for preparing a communication plan was deferred until after the next meeting (which will be in August).</p> <p>Written reports from sub-committees should be submitted following the meeting and will be circulated with the minutes.</p>	Sub-committees or working groups	16 May
6.11	Budget update	<p>Agenda paper 6.11 provided as background.</p> <p>The balance of funds and budget were presented to the Committee. It was noted that costings a number of activities are yet to be finalised as they were subject to decisions made at this meeting. Members were asked to nominate if they would like to make forward payments for next financial year. It was requested that invoices in the new financial year be accompanied by a short report of our progress to date.</p>	<p>Accompany requests for cash contributions with a progress report to Committee members.</p> <p>Invoice Department of Primary Industries, Parks, Water and Environment and Department of Land Resource Management for forward payment. Discuss forward payment with GRDC.</p>	<p>Secretariat</p> <p>Secretariat</p>	<p>June</p> <p>May</p>
6.12	International update	<p>A brief update on international activity was given by Neil McKenzie including notification that the IPCC was hosting a conference on soil carbon providing a linkage with ITPS and other international soil activity. Current international activity includes development of voluntary soil management guidelines that may be adopted by industry.</p>			

No	Agenda Item	Discussion / comment	Decision /Action	Who	Due Date
6.13	Other business	<p>A note of thanks was recorded to Alex McBratney and team for hosting the meeting and providing an informative lunchtime demonstration of some of the soil science at University of Sydney.</p> <p>A note of thanks was recorded to Vicki Woodburn from RIRDC for her contributions to this committee and it's activities.</p> <p>A note of thanks was recorded to Jennifer Alexander for her ongoing work on this Soil RD&amp;E strategy implementation.</p>			
6.14	Next Meeting	<p>25<sup>th</sup> August via video/teleconference.</p> <p>Next face-to-face meeting is planned for November 2016.</p>			

<b>Australian Soil Network</b>	Meeting Number: 7
	Location: Videoconference
	Date: 25 <sup>th</sup> August 2016
<b>AGENDA Paper</b>	<b>ITEM 7.2</b>
<b>Working Groups and Standing Committees - Process</b>	
<p><b>Background</b></p> <p>The Australian Soil Network has multiple current Working Groups and one Standing Committee (the National Committee on Soil and Terrain (NCST)). Working groups and standing committees are the primary mechanisms for progressing actions to implement the National Soil RD&amp;E Strategy. Current working groups have been established but have not been properly constituted with clear governance processes. The NCST is in a different category, identified as a Standing Committee because it is a long running national committee which pre-dates the National RD&amp;E Framework. It has had well established membership and mode of operation. The Australian Soil Network requires clear process for the establishment and governance of working groups and standing committees.</p>	
<p><b>Proposal</b></p> <p><b>Working Groups of the Australian Soil Network</b></p> <p>Working groups will be formed to undertake activities of the Australian Soil Network and deliver outcomes against strategy goals. Working groups are generally short-term working on specific activities with a clear end-point.</p> <p><i>Governance</i></p> <p>Working Groups are responsible to the Australian Soil Network (Soil RD&amp;E) Committee.</p> <p><i>Commissioning process</i></p> <p>Working Groups are commissioned by the Australian Soil Network Committee.</p> <p><i>Operation</i></p> <p>Working Groups will be for a fixed period, will have written Terms of Reference approved by the Australian Soil Network Implementation Committee, and will have specific, defined objectives and outputs.</p> <p>Each Working Group will have a leader or chairperson nominated by the Working Group itself and specified in the Terms of Reference.</p> <p>Working Groups are not resourced for their normal operations or meetings by the Australian Soil Network, but Working Groups may bring proposals for specific funds to the Australian Soil Network Committee by way of a meeting paper.</p> <p>Working Groups may receive funds from outside of the Australian Soil Network Committee operation (e.g. external project funds) where such a resourcing model is approved by the Australian Soil Network.</p> <p>The Australian Soil Network is generally not able to provide secretariat support to Working Groups but where there are specific essential support needs then Working Groups should discuss</p>	

these with the Strategy Leadership.

Working Group members are expected to provide their time, and operating costs associated with attending meetings, as part of their member contribution to the Australian Soil Network.

(The Working Groups are the primary means of member organisations contributing the expected significant in-kind time resources to the implementation of the strategy. Each member is encouraged to be part of at least one working group).

Members of Working Groups may be drawn from outside the membership of the Australian Soil Network committee.

#### *Reporting and Review*

Working Groups are to provide a progress report at each Australian Soil Network committee meeting.

Working Groups will be periodically reviewed and evaluated by the Australian Soil Network committee to consider aspects such as: progress toward objectives, outputs, required support, ongoing need, and period of continuation.

#### *Cessation*

A decision to cease the operation of a Working Group will be taken by the Australian Soil Network committee in consultation with Working Group members.

### **Standing Committees responsible to the Australian Soil Network**

A Standing Committee will generally have a national leadership, coordination, direction setting and/or advocacy function in its area of operation. Standing Committees will be of significantly longer duration than Working Groups and are more likely to have a resourcing model that includes funds sources external to those of the Australian Soil Network.

The governance, commissioning, operation, reporting, review and cessation of Standing Committees is as proposed for Working Groups but with the following differences:

- A Standing Committee of the Australian Soil Network can be a pre-existing national committee undergoing changes to lines of reporting (as in the case of the NCST).
- Standing Committees may have an indefinite duration.
- Standing Committees will work to a formal work plan.
- Standing Committees may constitute their own Working Groups.
- Standing Committees may be recognised as an individual entity in their own right.
- Standing Committees may deliver publications and products in their own right as overseen by the Australian Soil Network.
- Standing Committees may have external review processes where appropriate as determined by the Australian Soil Network or self-initiated.
- At least one representative member of a Standing Committee will be a member of the Australian Soil Network.

### **Suggested Structure for Terms Of Reference**

Overview (1 para)

Objective (one sentence)

Outcomes (Numbered dot points)

Purpose and scope (dot points)

Operational Procedures

Membership

Mode of Operation

Reporting arrangements

Chairing/Leadership arrangements

Financial considerations.

### **Required action**

For consideration and decision – it is proposed that the Australian Soil Network adopts the above governance framework for Working Groups and Standing Committees.

### **Resource implications**

None

### **Preparation and consultation**

Australian Soil Network Secretariat.

### **Attachments**

None

Australian Soil Network	Meeting Number: 7
	Location: Videoconference
	Date: 25 <sup>th</sup> August 2016
AGENDA Paper	ITEM 7.3
Working Groups and Standing Committees – Description and Status	
<p><b>Background</b></p> <p>This item is to reacquaint the Australian Soil Network committee with our Standing Committee and Working Groups and to briefly review each of them. Working group reports, if supplied, are included in the papers for this meeting. The task is to review progress and level of activity of each working group, to check if the need for the group still exists, and to confirm members' interest in progressing each piece of work. Consideration needs to be given to actions to help facilitate greater working group productivity. Not all of the detail in the paper below is complete; the discussion will be used to add information and the document will be developed and maintained as a register of Australian Soil Network standing committees and working groups.</p> <p><b>Australian Soil Network – Standing Committee 1 (ASN–SC1)</b></p> <p><b>Name:</b> National Committee on Soil and Terrain</p> <p><b>Purpose:</b></p> <ul style="list-style-type: none"> <li>• Act as a Standing Committee under National Soil RD&amp;E Strategy</li> <li>• Provide national leadership, coordination and direction in soil and terrain issues and information for sustainable use and management of the soil and land resource.</li> <li>• Provide expert advice on policy proposals and a strategic appreciation of emerging issues and priorities on soil and terrain matters.</li> <li>• Advise on the implications and relevance of soils to broader land management issues.</li> <li>• Coordinate national soil and terrain data and information to support evidence-based policy and decision making.</li> <li>• Provide national advocacy for all aspects of soil and terrain issues.</li> <li>• Act as the Steering Committee for the Australian Collaborative Land Evaluation Program (ACLEP).</li> <li>• Identify trends and technologies in soil and terrain assessment and monitoring - advise on implications for sustainable use and management of the soil and land resource and regional development issues.</li> <li>• Provide the framework and national standards for soil and terrain assessment.</li> <li>• Encourage capacity building in soil and terrain matters within government agencies, educational institutions and the community.</li> </ul> <p><b>Key outcomes:</b></p> <ol style="list-style-type: none"> <li>1 Enhanced Australian soil and land data infrastructure</li> <li>2 Current and future needs for Australian soil and land data and information are satisfied</li> </ol>	

- 3 Improved accessibility and utility of soil and land information to users
- 4 High quality technical advice on soil and land issues available for government
- 5 Better land use/management decisions through effective use of soil and land information

**Duration:** Ongoing

**Mode of operation:**

- Annual meeting with out-of-session communication as required (email, phone conferences, etc.). The annual meeting is hosted by a different jurisdiction each year.
- Representation on other working groups and tasks undertaken by individual working group members.
- Delivers to a work plan guided by the Terms of Reference (see purpose above).
- The primary mode of delivery is via the Australian Collaborative Land Evaluation Program (ACLEP). ACLEP was established in 1992, and is a proven model for national cooperation, collaboration and multi-jurisdictional activity. ACLEP is managed through the CSIRO and is directed and coordinated through the NCST.

**Resources:** In-kind contributions with direct resourcing for ACLEP coming primarily from the Australian Government (CSIRO and Department of Agriculture and Water Resources). Current funding has not been secured.

**Commissioning mechanism:** This is a longstanding national committee. Various iterations of essentially the same committee (e.g. National Soil and Land Survey Committee (1970s-1980s), Working Group on Land Resource Assessment (1990s-2000s) and the National Committee on Soil and Terrain) have been successively managed through the relevant ministerial councils of the day (including the Australian Soil Conservation Council (1980s), Natural Resources Ministerial Council, Primary Industries Ministerial Council) and their sub-committees (e.g. including the Technical Committee on Soil Conservation, Natural Resources Policies and Programs Committee, National Land and Water Resources Audit Advisory Council, Primary Industries Standing Committee). The NCST was instrumental in establishing the Soil RD&E Strategy both through the preparation of Campbell (2008) and via direct engagement with the NPIRD&E process. The abolition of the Natural Resources Ministerial Council led to the establishment of the current arrangements.

**Review process:** The work of the NCST has been reviewed primarily through external reviews of its activities, most notably the Australian Collaborative Land Evaluation Program and the Australian Soil Resource Information System. These activities were also subject to routine reviews by the funding agencies (Australian Government, CSIRO). The mandate of the NCST has always extended beyond agriculture although the latter has been its main focus. No formal review process for the NCST is currently in place.

**Members:**

Name	Agency	Jurisdiction
Mr Jason Hill (Chair)	Department of Land Resource Management	NT
Mr Daniel Brough (Secretariat)	Department of Science, Information Technology and Innovation.	QLD
Mr Tim Overhue	Department of Agriculture and Food	WA
Dr Neil McKenzie	CSIRO (National Soil RD&E Strategy Implementation Committee)	Soil RD&E
Mr Mark Imhof	Dept of Econ. Develop., Jobs, Transport and Resources	VIC
Ms Sandy Carruthers	Dept of Environment, Water & Natural Resources	SA

Mr Chris Grose	Dept of Primary Industries, Parks, Water and Environment	TAS
Mr Brian Jenkins	<b>Office of Environment and Heritage</b>	NSW
Dr Alison McInnes	Environment and Planning Directorate	ACT
Mr John Wilford	Geoscience Australia	Comm.
Dr Jane Stewart	Department of Agriculture (ABARES)	Comm.
Dr Michele Barson	Department of Agriculture	Comm.
Mr Mike Grundy	CSIRO	Comm.
Mr Peter Wilson	CSIRO (ACLEP)	Comm.

## Reference

Campbell, A. (2008). Managing Australia's soils: A policy discussion paper. Prepared for the National Committee on Soil and Terrain (NCST) through the Natural Resource Management Ministerial Council (NRMMC). [www.clw.csiro.au/aclep/documents/Soil-Discussion-Paper.pdf](http://www.clw.csiro.au/aclep/documents/Soil-Discussion-Paper.pdf)

## Australian Soil Network – Working Group 1 (ASN–WG1)

**Name:** Soil RD&E Capability Audit

**Purpose:** Undertake a second audit of soil RD&E capability across Australia and ensure results are consistent with the first audit (DAFF 2012, A stocktake of Australia's current investment in soils research, development and extension: a snapshot for 2010-11). The second audit will have a sharper focus and concentrate on numbers of specialists (FTEs) and overall levels of investment. The results will resolve differences across the various fields of RD&E and outline key demographic features that will affect the effectiveness of soil RD&E over the next decade.

**Key outputs:** Published Capability Audit of Soil RD&E in Australia

**Duration:** Six months (TBC)

**Mode of operation:** TBC

**Resources:** None allocated at Meeting 6 of the Implementation Committee.

**Commissioning mechanism:** Implementation Committee Meeting 6.

**Review process:** TBC

**Members:** Neil McKenzie will co-lead the update with Michele Barson plus Michael Crawford, Alex McBratney, Brenda Kranz and Paul Lawrence.

## Australian Soil Network – Working Group 2 (ASN–WG2)

**Name:** Soil information infrastructure

**Purpose:**

1. Expand the scope of the current ASAP Stream 4 proposal to ensure that private sector components are fully integrated.
2. Prepare the revised project proposal along with a budget identifying current expenditure and options for new expenditure.
3. Develop a viable investment model with low overheads and transaction costs.

**Key outputs:** Revised Proposal and funded program of work

**Duration:** Six Months (TBC)

**Mode of operation:** TBC

**Resources:** None allocated at Meeting 6 of the Implementation Committee

**Commissioning mechanism:** Implementation Meeting 6.

**Review process:** Oversight of the Working Group to be undertaken by a sub-committee of the Implementation Committee (Paul Lawrence, Neil McKenzie and Michele Barson).

**Members:** Dan Brough (Queensland Department of Science, Information Technology and Innovation), Peter Wilson (CSIRO), Sandy Carruthers (South Australia), Chris Souness (Birchip Cropping Group), Mark Pawsey (Site-Specific Technologies (SST)), Ross Searle (CSIRO), Brendan Malone (Uni. Sydney) (Membership to be confirmed, not all approached as yet).

**Notes:** The Australian Soil Assessment Program (ASAP) was considered at Meetings 1 and 3. A staged approach towards implementation was favoured. The 2015 Planning Forum highlighted the importance of the soil information infrastructure components of ASAP and in particular, the importance of integrating soil data with other data streams (e.g. weather, management practices and crop yield) that are sourced and managed from different sectors (e.g. government, research agencies, industry, farmers). Government-maintained soil data and infrastructure also need to be linked with industry and farm data (e.g. paddock soil tests, yield maps) to develop new site-specific information useful to guide soil and farm management. However, this requires an overhaul of current soil information systems. The Working Group was established to define the scope of the activity and agree on deliverables prior to developing a work plan.

### **Australian Soil Network – Working Group 3 (ASN–WG3)**

**Name:** Investor Forum

**Purpose:** Run an investor forum in 2016 to help coordinate soil RD&E investors/investment and increase funds for soil RD&E activities directed towards the five priorities.

**Key outputs:** A successful forum that leads to funds of at least \$XXXX being secured.

**Duration:** Six months (TBC)

**Mode of operation:** TBC

**Resources:** None allocated at Meeting 4 of the Implementation Committee.

**Commissioning mechanism:** Implementation Committee Meeting 4.

**Review process:** TBC

**Members:** Secretariat, Felice Driver, Brenda Kranz

### **Australian Soil Network – Working Group 4 (ASN–WG4)**

**Name:** Register of field sites.

**Purpose:** Develop a readily accessible and updatable database of long term soil related trial sites that can allow stakeholders and researchers to determine if there are existing trial sites and historical samples and records that may be used to investigate particular soils related issues without having to establish new and/or long term research sites. This will increase the efficiency of research and allow research questions to be examined using long term trial sites.

**Key outputs:** A spreadsheet available on the Australian Soil Network webpage with search functions

via either a scalable and clickable map (that would provide basic details) or a spreadsheet that users can sort or filter. The on-line data will be a copy of the dataset with the original being retained by the Australian Soil Network Secretariat.

**Duration:** Completion by December 2016

**Mode of operation:** Small committee with meetings to be held via teleconference as required.

**Resources:** None allocated at Meeting 3 of the Implementation Committee.

**Commissioning mechanism:** Implementation Committee Meeting 3.

**Review process:** TBC

**Members:** Warwick Dougherty (lead), Michele Barson, Karen Holmes, Allan Williams and Paul Lawrence

**Notes:**

### **Australian Soil Network – Working Group 5 (ASN–WG5)**

**Name:** Plain English version of the soil RD&E priorities

**Purpose:** Improve communication about the soil RD&E priorities for Australia and gain widespread support.

**Key outputs:** Publication online and in hardcopy of a Plain English version of the five soil RD&E priorities.

**Duration:** TBC

**Mode of operation:** Small committee with external support from science communication specialists.

**Resources:** None allocated at Meeting 3 of the Implementation Committee

**Commissioning mechanism:** Soil RD&E Implementation Committee Meeting Number 3.

**Review process:** Draft to be approved by the Implementation Committee at Meeting Number XX

**Members:** Michael Crawford (lead), Neil McKenzie, Peter Voller and Ian Anderson

### **Australian Soil Network – Working Group 6 (ASN–WG6)**

**Name:** Teaching curriculum for soil science.

**Purpose:** Collate and review Soil Science teaching curriculum (plus education and training programs) information and make available via the web. Develop a Soil Science Masters program and identify soil science career pathways.

**Key outputs:** Skills audit, Masters program, accredited soil science curriculum, vocational education and training programs.

**Duration:** TBC

**Mode of operation:** TBC

**Resources:** None assigned.

**Commissioning mechanism:** The National Soil RD&E Strategy, Section 6.1, Figure 9, Table 8.

**Review process:** TBC

**Members:** Damien Field (lead, University of Sydney), ... TBC

**Notes:**

### **Australian Soil Network – Working Group 7 (ASN–WG7)**

**Name:** Impact analysis and an evaluation plan

**Purpose:** Provide a framework to the secretariat for developing impact analysis and an evaluation plan to assist with prioritising strategy activity and expenditure.

**Key outputs:** An evaluation plan.

**Duration:** Four months (TBC)

**Mode of operation:** TBC

**Resources:** none assigned.

**Commissioning mechanism:** Soil RD&E Implementation Committee Meeting Number 5

**Review process:** TBC

**Members:** Cameron Allan and Michael Crawford, Secretariat

### **Other possible activities that could be delivered by working groups (needing further consideration and development)**

#### Communication plan

**Task:** Develop a communication plan for the Australian Soil Network.

**Members:** Volunteers?

#### Knowledge Exchange

**Task:** A pilot study into the value of knowledge exchange. User needs and preferred sources of information; system for knowledge exchange.

**Members:** Pauline Mooney, Paul Lawrence, Georgina Kelly, Neil McKenzie.

#### National Models for Collaboration

**Task:** Develop a framework or roadmap for collaboration across the national soil RD&E space (?)

**Members:** Paul Lawrence, ... others?

#### National Soil Management Innovation Competition

**Task:** Design and run a National Soil Management Innovation Competition open to the public to identify ideas from farmers or the general public that are worthy of further research and development and that could receive institutional support.

**Members:** Hamish Cresswell, other Secretariat, others?

#### Collaborative soil-related software development

Task: Hack-a-thon

Members: Georgina Kelly (lead), Karen Holmes, Peter Voller, Dan Brough and Damien Field

### Physical Infrastructure

The Physical Infrastructure Working Group will not start operating as yet. It was suggested to ask Phil Moody if he would lead this WG. It was agreed that the Physical Infrastructure Working Group should report to the NCST.

### **Other ideas not yet progressed:**

National speed dating – program of inter-agency meetings to identify specific areas of collaboration

RDCs jointly identifying cross-cutting soil research interests

Identify bridging projects – activities to link RD&E programs in different agencies and jurisdictions

COAG paper

Soil related extension and knowledge exchange – national planning white paper

### **Required action**

Review the above list of working groups and activities.

Be prepared to update the meeting on working group progress and/or solutions to impediments.

Consider which working groups and activities that you would like to lead or assist with.

Consider which working groups and activities that you consider add significant value, and if there are any that you don't see value in continuing.

### **Resource implications**

Item has no immediate, direct resourcing implications. Working groups may require resourcing but requests will be brought forward to meetings as separate items.

### **Preparation and consultation**

Australian Soil Network Secretariat.

### **Attachments**

Progress reports from working groups.

Australian Soil Network	Meeting Number: 7
	Location: Videoconference
	Date: 25 <sup>th</sup> August 2016
AGENDA Paper	ITEM 7.6
<b>Member and Working Group updates</b>	
<p><b>Background</b></p> <p>It was agreed at Meeting 1 that members of the Implementation Committee would provide written updates that highlight key developments, challenges and emerging issues for their organization. A brief 3-5 minute verbal summary of these would be provided at the meeting.</p>	
<p><b>Key issues</b></p> <p>The intent is to provide all members with a clearer understanding of soil RD&amp;E matters across all jurisdictions and organizations. With time, members should develop a more collegiate and integrated understanding of soil management across Australia.</p>	
<p><b>Required action</b></p> <p>Members are requested to provide a brief 3-5 minute verbal summary at the meeting.</p>	
<p><b>Resource implications</b></p> <p>Minor. Members will normally draw on existing review and reporting materials from their organization.</p>	
<p><b>Preparation and consultation</b></p> <p>Soil RD&amp;E Secretariat with input from members of the Soil RD&amp;E Implementation Committee.</p>	
<p><b>Attachments</b></p> <p>Attachment X: Member Updates</p>	

## Attachment 2: Member and Working Group Updates

### Member updates:

- Northern Territory
  - Tasmania
  - Australian Government
  - CSIRO
  - Victoria
- 
- Cotton and Dairy Australia both indicated they had nothing to report

### Working Group updates:

- Register of field sites (ASN–WG4)

# NORTHERN TERRITORY, Jason Hill, NT Department of Land Resource Management

## BACKGROUND

The Department's enhanced agricultural soil and land suitability mapping program is ongoing. The priority is the development of new agricultural precincts on pastoral and Indigenous land, preferably in the vicinity of infrastructure such as sealed roads and the railway.

The branch is still maintaining a broader scaled survey program on pastoral land in the northern VRD.

Regional Land Type (RLT) mapping across the southern pastoral regions is continuing. This is a remote sensing project that uses Landsat, DEM's and Ecognition software to refine land system boundaries and disaggregate land system components.

The Department has also initiated a DSM project in the Roper and investigations on the Keep Plain on the WA border.

## ISSUE(S)/ITEMS OF INTEREST

### 1. **Fine-scale Agricultural Land Suitability Mapping**

A four year land suitability and water program (2014-2018) has been endorsed by the Minister for Land Resource Management. Published reports thus far from this program include the following.

- *Soil and Land Suitability Assessment for Irrigated Agriculture in the Larrimah Area*
- *Soil and Land Suitability Assessment for Irrigated Agriculture in the Wildman River Area*
- *Land Resources of Portion 1918, Tennant Creek*
- *Soil and Land Capability Assessment for Irrigated Agriculture on Kurnturlpara and Part of Warumungu Aboriginal Land Trusts*

Other projects in this series due to be published in the near future include, Ali-Curung and Tennant Creek west. 2016 projects include Gunn Point outside Darwin, Wadeye SW of Darwin, Orange Creek in Alice Springs, Ti Tree north of Alice Springs and the Dunmarra area 600km south of Darwin. These investigations are collecting soil information in areas where little or no existing soil profile or laboratory data currently exists.

### 2. **Pastoral Land Resources**

#### **Pastoral Land Resources (central and north)**

1:100 000 mapping projects over pastoral leases in the northern VRD are ongoing. Fieldwork is being undertaken in 2016, which includes samples for soil chemistry.

#### **Pastoral Land Resources (south)**

A regional land type project across the southern pastoral districts has produced refined land system mapping (including mapping of land system components) across the Barkly and Tennant Creek regions. The project started as a rapid assessment of vegetation and pastures but has developed to encompass soil-landscape information. The project is essentially a disaggregation project. Funds

have been set aside in the 2016/17 financial year to (i) validate the mapping in further detail and (ii) describe and laboratory test a range of representative soils across this study area, and possibly in the Alice Springs pastoral region.

### **3. Digital Soil Mapping**

#### **Roper River Catchment**

The Department has initiated a DSM project across a part of the Roper River Catchment. A reconnaissance investigation is planned before the end of the 2016 dry (field) season so a sampling strategy can be developed over the 2016/17 wet season.

#### **CSIRO NAWRA Darwin Catchments Land Suitability Assessment**

The project has commenced with 2 weeks fieldwork recently undertaken, with an additional 2 weeks planned later in August.

### **4. Keep River Plain**

In collaboration with Geoscience Australia, the NT Government has signed an agreement with the Commonwealth to undertake studies on the Keep River Plain regarding its suitability for irrigated development. The study will use high resolution AEM data and field investigation to map salinity risk and other potential issues.

A separate minor investigation is also being undertaken on Legune Station in the north east corner of the NT.

## **TASMANIA - JURISDICTIONAL UPDATE**

**This report has previously been presented to the National Committee for Soil and Terrain by Darren Kidd.**

### **BACKGROUND**

The Department of Primary Industries Parks Water and Environment (DPIPWE) is the lead agency for soils and terrain assessment on private land in Tasmania. A number of other organisations provide a significant role in research, extension and education. These include the University of Tasmania and the Tasmanian Institute of Agriculture, Forestry Tasmania, the three Tasmanian natural resource management regions and a number of agricultural consultants. The DPIPWE role is primarily to provide information to government to support and guide policy development on agricultural matters.

#### **1. Continuation of Tasmanian Government ‘Water for Profit Program’ (DPIPWE/ TIA/ UTAS)**

**(Program progress has been delayed due to staff redeployment into biosecurity (Myrtle Rust Infestation Response) and Wildfire management duties (SW world heritage areas) and further delayed due to recent floods that have severely impacted field operations.**

- DPIPWE have completed v1.0 Enterprise Suitability Mapping (ESM), which will be updated during the Water for Profit Program using Digital Soil and Climate mapping at 80m resolution (with an aim of improving to 30m resolution). These products have now been

placed on the Department's publically accessible spatial web portal ([www.theLIST.tas.gov.au](http://www.theLIST.tas.gov.au)).

- DPIPWE has commenced (April 2016) latest round of soil sampling to use as calibration data to update v1.0 Tasmanian Digital Soil Maps (TDSM) – strategically based on areas with high predictive uncertainty and high agricultural versatility in the major new irrigation schemes (Midlands)
- DPIPWE continue the 'Tasmanian Legacy Soil Data Capture' (TLSDC) to feed into the v2.0 TDSM process – to date, over 18,000 additional soil sites of varying quality have been sourced, including data from forestry and world-heritage land, that was previously under-represented in v1.0 TDSM.
- DPIPWE have used all 20 ESA surfaces to develop a spatial 'Enterprise Versatility Index' at 80m resolution, identifying which areas of the state are more suited to more enterprises, and applied gross-margins agricultural analysis data to each ESA surface to determine a 'median potential gross-margins' map, showing which areas of the State are more likely to successfully host high-valued enterprises. This will be refined and released with v2.0 TDSM updates.
- Strategic climate logger redeployment for a further 12 months has been finalised to enhance the DPIPWE v1.0 Tasmanian Digital Climate Maps (TDCM) (terrain based micro-climate mapping)
- Refining Enterprise Suitability rulesets – in conjunction with Tasmanian Department of State Growth to identify new areas for sparkling wine grape production – other industry engagement being established/ continuing. DPIPWE are also working at incorporating parametric weighting of suitability soil and climate inputs, and a continuous (fuzzy) rating system.
- DPIPWE have been using v1.0 TDSM surfaces to develop 'soil vulnerability' layers, to incorporate into v2.0 ESM – preliminary suitability rulesets were predominantly productivity-based – updated rulesets will also incorporate the vulnerability layers as a measure of sustainability of enterprise assessments. These include soil (water) slope erosion (based on the KLS components of RUSLE), Wind Erosion, Salinity, Sodicity, Compaction (livestock) pugging potential, and waterlogging. Draft surfaces have been completed, and will be refined using v2.0 TDSM.
- DPIPWE are working with the University of Sydney (FAE) to incorporate TDSM uncertainty ranges into the ESA rulesets, as probability estimates of each suitability class occurring in each pixel.
- TIA (Tasmanian Institute of Agriculture)/ University of Tasmania has established a new 'soil hydrology lab' – will be hydrologically 'characterising' significant/ common Tasmanian irrigated cropping soils – this will then feed into National Pedo-transfer Inference systems to improve Tasmanian inferences, then applied to re-run and improve v2.0 DSM hydrology surfaces (ksat, WP, FC etc)
- TIA have established peer-to-peer networks of farmer groups. Benchmarking will be used to support the groups to set productivity goals for yields and inputs for both cropping and pasture-based farming systems. The groups will set goals for improving irrigation management, and develop and share strategies for meeting these goals across their region.

## 2. ESA Climate Change Scenarios

- DPIPWE have statistically down-scaled climate futures mapping for the Tasmanian Climate Change Office (Dept of Premier and Cabinet) to 80m resolution, and incorporated into v1.0 ESA mapping developed under the Water for Profit Program. This shows how the suitability

extents of certain crops will be affected by changing climate, at 80m resolution, in terms of terrain-based predictions of ‘frost-risk’, growing-degree-days’, ‘chill-hours’ and ‘heat-stress’. These products for different emissions scenarios have also been uploaded to [www.theLIST.tas.gov.au](http://www.theLIST.tas.gov.au) for spatial public access.

### **3. DPIPWE Tasmanian Soils Database**

- Tasmania’s soil database archives, previously stored on an ORACLE database system with locally-derived storage structures, then re-mapped to ‘SITES’ format and stored using MS Access, will be migrated to the Tasmanian Natural Values Atlas – a publically accessible web-based information portal ([www.naturalvaluesatlas.tas.gov.au](http://www.naturalvaluesatlas.tas.gov.au)). This has a web-based front end and ORACLE back end. The SITES format has been maintained, as well as the development of a variety of reporting, data-upload and entering features, as well as full spatial viewing capabilities. Testing of this database will continue over 2016 before going ‘live’.

### **4. Soil Condition Monitoring**

- The Tasmanian Soil Condition Evaluation and Monitoring Project commenced in 2004 to measure and monitor the condition of a variety of Tasmanian soils under a range of land uses. Each of 250 sites was to be revisited and resampled every five years to determine any trends in changes in soil condition. DPIPWE recognise the value of this project but currently it remains an unfunded project and is temporarily on hold while alternative funding models are investigated.

### **5. DPIPWE- Sense-T Collaborations**

Sense-T is building an economy-wide sensor network and data resource, creating a digital view of Tasmania and giving industry, governments and communities the tools to solve practical problems and make better decisions; tested in Tasmania and applied across Australia and the world. Based at the University of Tasmania, Sense-T is a partnership between the University, CSIRO and the Tasmanian Government, and is also funded by the Australian Government.

- Smart-Sensor Irrigation/ Irrigation Pathway Projects - On-farm sensors will inform the development of a smartphone app to help farmers decide when and how much to irrigate, tailored to their individual irrigation systems and soil and crop types, helping to improve water use efficiency and agricultural sustainability. DPIPWE have developed automated code (as part of the app) that allows upload of existing soil data, EM mapping, or v1.0 TDSM surfaces, and clusters these into variable-rate irrigation (VRI) management zones, based on the number of soil moisture sensors a farmer can afford. The code uses the Fuzzy- k-means algorithm to cluster the key soil properties, which are then applied to the VRI type (speed or emitter control), which will then allow the farmer to optimise water application based on current moisture levels, and weekly forecasts using BoM Meteye climate grids. The project is a collaboration between TIA, CSIRO, UTas, NCEA, DPIPWE, and Definium Technologies.
- Pasture-Predictor App – Collaboration between TIA and CSIRO to extend research conducted during Sense-T's Stage 1 Beef and Dairy project. Researchers will enhance pasture prediction models by using sensors and data to allow farmers to predict and prepare for different scenarios, and will further develop on-animal sensors to better monitor health, grazing and productivity in the dairy and livestock industries. Pasture growth predictions through the app have been based on regional (APSIM-enabled) modal soil characteristics and coarse resolution climate data – DPIPWE have been collaborating with TIA to spatialize these products using v1.0 TDSM and TDCM products, and have applied them to downscaled Climate Futures Tasmania datasets to predict pasture growth at 2030 and 2050.

- DPIPWE (Sustainable Landuse & Info Management (SLIM)) have secured a secondment arrangement to firstly, prove the concept of downscaling existing BoM Meteye forecasting from 5km resolution, down to 80m resolution using long-term Bom data, DPIPWE temperature sensors, and correlations with terrain derivatives. Once the automated coding is developed, this will then be incorporated into existing Sense-T sensor systems through the Sense-T platform, and made available as a publically accessible web-service and/ or app, allowing farmers to plan for extreme temperature events, at a resolution that will capture niche terrain areas hosting niche agricultural markets. Preliminary testing shows that the downscaling (near real-time and weekly forecast) can successfully be downscaled to 80m resolution to around 1.5°C.

## **6.0 National Activities**

- DPIPWE (through travel funding from ACLEP/ CSIRO) have provided in-kind support at the recent DSM training of NT soil-mapping recruits, assisting Ross Searle and Mark Thomas deliver different DSM training components through the R-coding platform (see NT jurisdictional/ DSM training report). DPIPWE have recognised and acknowledged the collaborative support and assistance received through ACLEP over many years, especially in developing their own DSM potential through pilot projects and DSM training, which is now part of core-business. DPIPWE will continue to offer support and advice to the NT/ CSIRO in mapping the developing areas across the North, especially in the operational aspects of applying DSM, as a gesture of returning developed expertise back into the collaborative process, and sharing resources in terms of DSM knowledge and experience.

## **Continued Collaboration and Innovative Development with the University of Sydney (FAE)**

- The Australian Research Council Linkage Project (LP110200731, “Wealth from Water” was completed for the pilot project areas (Meander and Midlands) in 2015 – this was a highly successful partnership that adapted theoretical DSM into operational government land evaluation, developing professional expertise in DSM, working with Alex McBratney, Budiman Minasny, and Brendan Malone.
- The collaboration is being continued in working (presently un-funded) on using v1.0 TDSM surfaces to quantify spatial Soil Security for Tasmania, in terms of the inputs of Capability, Condition, Capital, Connectivity and Codification (McBratney 2015). This will include incorporating v1.0 soil vulnerability surfaces and versatility indices as a measure of agricultural capability, using SCEAM rulesets, applied to land use and ASC order (with development of new ASC orders map of Tasmania, based on TDSM inputs as covariates) to determine average condition over time, gross-margins analysis to provide a measure of spatial economic agricultural capital and other measures of natural capital in terms of eco-systems services (carbon storage, riparian filtration etc). It is hoped that the methodology developed and Soil Security outputs will provide a measure of the soil’s contribution to food and water security in Tasmania, enable marketing of sustainable enterprises, consistent with the State’s clean, green market image, and provide at least a starting template for this analysis to be applied elsewhere.
- The University of Sydney and DPIPWE (SLIM) have developed another ARC project application and methodology to provide a pilot project and near real-time and short-term forecasting of soil moisture status at 30m resolution using DSM surfaces, downscaled MetEye and a network of soil-moisture sensors. If successful, this three year collaborative project will provide a tool for farmers to better schedule irrigation (as per the Sense-T project), and plan for optimal operational activities such as seed-bed preparation, planting, sowing, stock rotations and harvesting.

## Department of Agriculture and Water Resources - Update for August 2016 meeting

### Catchment scale land use mapping

The *Catchment Scale Land Use of Australia – Update May 2016* (50 m raster data) was released in June for download at: [http://data.daff.gov.au/anrdl/metadata\\_files/pb\\_luAusg9abll20160616\\_11a.xml](http://data.daff.gov.au/anrdl/metadata_files/pb_luAusg9abll20160616_11a.xml). The dataset is accessible via [data.gov.au](http://data.gov.au) and the Australian National Map. The *Land Use and Management Information for Australia* (ACLUMP) website is being updated to include links to the input state data. Areas updated since the March 2015 release include : Wet Tropics, Cape York, Border Rivers Maranoa-Balonne and South West Natural Resource Management regions in Queensland; Tasmania; the Murray River Corridor of South Australia; and Victoria.

Over the last 12 months \$366,389 has been provided to state and territory agencies to contribute to mapping of areas where bananas are a significant crop (Qld Wet Tropics, Kununurra (Ord River Irrigation Scheme), Carnarvon and Broome, WA and Tweed and Coffs Coasts, NSW) to assist in the management of the soil borne Panama TR4 Disease.

Funds (\$1.62 million) have also been provided to help update mapping (using the new version 8 of the ALUM classification) for the Northern Territory, Tasmania, Mackay/Whitsunday NRM region, Queensland, the Adelaide Hills and Northern Adelaide Plains, South Australia and the Goulburn Murray Irrigation District and Victorian Sunraysia Pest Free Area, Victoria.

### National land use mapping (1:2.5 million)

The *Land Use of Australia 2010-11* was released in July and can be downloaded at [http://data.daff.gov.au/anrdl/metadata\\_files/pb\\_luav5g9abll20160704.xml](http://data.daff.gov.au/anrdl/metadata_files/pb_luav5g9abll20160704.xml) or via the *Land Use and Management Information for Australia* (ACLUMP) website. On the ACLUMP website there are also summary land use statistics and map. The dataset is accessible via [data.gov.au](http://data.gov.au)

### Gully mapping and monitoring in the Great Barrier Reef catchments

\$200,000 has been provided to CSIRO and Qld DSITI to further develop and test a method that applies digital aerial photogrammetry for mapping and monitoring gully erosion in the Burdekin catchment. Digital aerial photogrammetry offers higher surface resolution than satellite products. It is a cost effective solution for generating digital surface (DSM) and ground elevation (GEM) models at 10 – 50 cm resolution over large areas when compared with airborne and surface LiDAR, archived stereo aerial photography and satellite data systems. Surface infrastructure and vegetation are removed from the DSM by automated methods to produce the ground elevation model.

Baseline digital terrain models are then processed using a multi-direction flow-path prediction model that simulates water flow across a landscape. An estimate of the area of water draining to each point can be calculated as water flows are followed down through the catchment. Repeated surveys can produce time-series ground surface reconstruction at 10-50 cm spatial resolution to show changes in water flow or soil surface elevation, and provide an estimation of stream bank and gully erosion rates. This method is expected to be attractive for ongoing monitoring as high precision digital photography is routinely collected by state mapping authorities, although capture specifications may require some modification for future gully mapping.

### New soil condition assessment for Australia

Funds (\$324,249) have been provided to CSIRO, the NSW Office of Environment and Heritage and ABARES to deliver digital maps to guide prioritisation of investment to address risks to soil function within Natural Resource Management regions across Australia. Soil condition, including the extent of soil erosion by water (hillslope erosion), wind erosion extent and severity, soil acidification, organic carbon content and nutrient imbalance will be assessed using existing information. This information will be used to compile spatial data sets for analysis using the latest version of the Multi-Criteria

Assessment Shell for Spatial Decision Support. The data sets will help identify priority areas for investment in improving soil condition, provide input to the soil condition account for National Environmental Economic Accounting, and for national reporting on the status of the resource base. State and Territory agency experts will be invited to provide input to the process through a series of virtual workshops. The resulting data sets will be made publicly available in GIS format.

### **Reporting trends in land management practices**

Most of the funding provided through the Agriculture stream of the National Landcare Programme is aimed at improving soil condition through the adoption of better land management practices. Data collected by ABS through the Agricultural census and the REACS survey are analysed at NRM region level for the broadacre cropping, dairy, grazing and horticulture industries, and published annually (see [www.agriculture.gov.au/abares/monitor](http://www.agriculture.gov.au/abares/monitor) then click on Explore) to help assess programme progress. Data from the REACS surveys conducted in 2012-13 and 2013-14 have been reviewed, but not loaded, due to a 40 % drop in response rates to land management practice questions. ABS is changing the Estimated Value of Operation (which determines whether agricultural businesses are sampled/surveyed) from \$5000 to \$40,000. We are waiting on advice from ABS on the impact this change will have on the numbers of businesses in each industry at NRM region level for which data will be available to decide future reporting arrangements.

### **Virtual national soil archive project**

CSIRO was provided with funds (\$265,444) to undertake consultation and prepare a user needs analysis to determine likely users of a national virtual archive, the types of uses and applications for such a facility, thereby developing a value proposition. Recommendations for implementation of a virtual archive, including the technical specifications for a supporting interoperable information system and web based archive portal application will be made. The project also aims to implement essential components of the required interoperable information infrastructure, and publish standardised data services from the CSIRO National Soil Archive and participating state agency archive databases. It will deliver a demonstration national virtual archive portal which will access standardised data services from multiple, dispersed sources. The draft final report, to be reviewed by the National Committee on Soil and Terrain before submission to ASN, is expected shortly.

### **Digital innovation and risk management in agriculture – workshop 14 October**

An informal workshop is being held a DAWR to showcase recently funded projects (including Soil Sensing – Ross Searle CSIRO; Phil Tickle - NRM Spatial hub, CRC for Spatial Information; Geoff Hinch - Smart data management for smart livestock production, Sheep CRC/University of New England; The MAX biosecurity data base (information and biosecurity risk sharing) - Dean Bellingham Vic DEDJTR; and On line information to improve farm management - Peter Dalhaus, Federation University and Cam Nicholson, Nicon Rural Services/Corangamite CMA.

The workshop will provide Departmental staff with an overview of the emerging digital environment for agriculture, identify developments that could be leveraged by the Department to improve policy and program development, provide opportunity to discuss how the Department can best support the digital innovation environment for agriculture, and identify potential roadblocks to broader uptake of the results of these (and similar) projects and how these might be overcome. I will report back on implications for Soil RD&E.

## CSIRO

*August 2016*

The soil R&D capability at CSIRO is mainly distributed between two business units – CSIRO Agriculture and Food, and CSIRO Land and Water. CSIRO Agriculture and Food commenced as an entity on the 1<sup>st</sup> July after food research and post-farm gate processing capability was merged with the former CSIRO Agriculture. The entity is led by Dr John Manners (Director; based in Canberra) with now two Deputy Directors – Dr Michael Robertson (Perth) and Dr Martin Cole (Sydney). CSIRO Land and Water is led by Dr Paul Hardisty (Director; Perth) and Dr Paul Bertsch (Deputy Director; Brisbane).

CSIRO is investing in six new Future Science Platforms that commenced 1 July 2016. One of these is called 'Digiscape' and is focussed on decision support in agricultural industries. Part of the challenge is linking our various predictive models across domains and with digital technologies such as data visualisation, artificial intelligence, and assisted decision making. Digiscape will progress "modelling for management" by building on large prior investment in predictive modelling and established decision support systems. The other five Future Science Platforms are: Probing Biosystems, Synthetic Biology, Environomics, Deep Earth Imaging, and Active Integrated Matter. Research collaboration is welcomed. These initiatives will generate opportunities for recruitment of CSIRO postdoctoral fellows.

CSIRO Agriculture and Food will close the Ginninderra Experimental Station on the outskirts of Canberra within the next few years and has purchased a new 290 ha property to be developed as a field experimental station at Boorowa (NSW). Planning is underway including for a detailed soil survey of the property using a mobile sensor platform, automated core scanning, and 3D soil mapping. Various agronomic experiments and other research will be run at the site and there is opportunity for collaboration with both private and public partners.

Previously we reported the current round of job losses in CSIRO and said there was no impact on soil science capability. It has become apparent that there are in fact a small number of soil science positions impacted.

## Agriculture Victoria - August 2016

### **7<sup>th</sup> International Nitrogen Conference, 4-8 December 2016, MCG Melbourne**

Agriculture Victoria staff, led by Dr Cameron Gourley, are contributing to the organisation of this conference. The plenary speakers are now all finalised, with invitees including many of the world's leading research and policy analysts on nitrogen cycling, food security and environmental emissions.

About 330 papers have been submitted at the closing date. Total sponsorship is in excess of \$100,000.

The conference will provide a fantastic opportunity for Australian scientists with an interest in nitrogen to attend a world class international conference in Melbourne on an important local and global issue.

[www.ini2016.com](http://www.ini2016.com)

### **New grains projects commence**

Two new soils projects have commenced to address soil related issues for the high rainfall cropping zone in south eastern Australia, funded jointly by Agriculture Victoria and GRDC under the collaborative bilateral R&D agreement.

The first project is investigating the effect of waterlogging on nitrogen dynamics, led by Dr Fiona Robertson, and is worth \$1.75m over years.

The second project is investigating the spatial variability of acidity and liming effects and is led by Dr Nathan Robinson. It is worth \$1.4m over 3 years.

Dr Roger Armstrong is leading another GRDC funded project to better understand the amelioration processes of the subsoil application of amendments in the Southern Region. This is a large collaborative project between GRDC, Agriculture Victoria, SARDI, PIRSA, NSW DPI, TIAR, La Trobe University and a number of farmer groups. In total, it is worth \$9.5m over 5 years.

## Working Groups

### Register of field sites (ASN–WG4)

A DPI NSW staff member has been setting the survey up in SurveyMonkey and there are plans to test it with the working group in the next couple of weeks, then the broader committee before releasing ASAP. Once finalised, Warwick Dougherty will email the survey background info/rationale and link to the committee members for distribution in their networks.

The data will then be exported to a spreadsheet and loaded on to the webpage with search functions via a zoomable map and data file.

Warwick hopes to have the survey live mid September at the latest and data going live on webpage in late October with periodic revisions as more data rolls in.

A slightly revised project document is attached that includes the key data fields to be captured and an example of the zoomable map.

### Project document: 'Register of long term soil related research sites in Australia'

#### Background

In 2011 the expenditure on Soils related RD&E was estimated to be \$124M (DAFF 2011). The Soils RD&E Strategy (hereafter referred to simply as '*the strategy*') identifies a number of priority activities to improve the effectiveness and outcomes from Soils RD&E in Australia. One of the goals of the strategy is to improve use of physical infrastructure, which includes long term trial sites. The strategy notes that '*these (long term trial sites) are essential to enable assessment and comparison of gradual changes in soil attributes under different farming systems, for evaluation of the effects of climate change and of alternative adaptation strategies and for testing of innovations in soil management at practical spatial and temporal scales*'.

Whilst short term trials are often satisfactory for examining factors that impact quickly upon agronomic or ecosystem functioning (such as inorganic fertiliser input effects on crop yield), in other cases long term trials are required to assess longer term agronomic and ecological impacts. For example factors such as pH, soil carbon and microbial communities may take much longer to respond to treatments. Long term trials are also important for examining effects of climate change, systems impacts and validation of models.

The Soils RD&E Strategy notes that 'A trend to undertake short- to mid-term soil RD&E studies on private properties is expected to increase. The best use of field stations for soil research will likely shift towards long-term studies on valued ecosystems (or cropping systems), supported by quality-assured measurements and detailed records, together with assured long-term staffing and funding.'

The Soils RD&E strategy recommended that 'a network (*for sharing information about and interrogating existing long-term experiments*) should be developed, with consideration given to how experiments can be accessed by collaborators to address scientific questions'.

This project will assist in addressing this recommendation and has been endorsed as a priority by the Soils RD&E Strategy Implementation Committee. Developing a register may allow researchers to identify existing sites, samples and data sets that can be used to investigate new issues and problems without the cost of having to establish new trial sites and will also provide long term data sets. This may also help foster further collaboration amongst researchers.

## Purpose

Develop a readily accessible and updatable database of long term soil related trial sites that can allow stakeholders and researchers to determine if there are existing trial sites and historical samples and records that may be used to investigate particular soils related issues without having to establish new and/or long term research sites. This will increase the efficiency of research and allow research questions to be examined using long term trial sites.

## Benefits of a long term trial sites register

- Potential access to pre-existing trials and data sets for relatively little cost
- Ability to analyse treatment effects over longer time frames than possible with traditional 3-5 year research trials
- Greater return on investment from limited RD&E funding
- Ability to value and prioritise long term trial sites for on-going resourcing
- Improved collaboration between researchers
- A step towards a National network and system of long term research and monitoring sites

## What constitutes a long-term trial site

In Australia the majority of research trials have traditionally been funded for 3 years which means that the vast majority of trials are abandoned after this period. However there are numerous trial sites that have been run for longer periods and some that have been run for long periods of time of 30-50 years. What constitutes a long term trial site in some respects depends on the issue being examined. Rasmussen *et al.* (1998) defined long term trial sites as greater than 20 years whilst others have used shorter timeframes, e.g. 10 years (Martin *et al.* 1998) or alternative more general criteria such as '.....plan to run for long enough to cause measurable change in some indicators of the status of the crop-soil resource base' (Martin *et al.* 1998). Specifying particular criteria may preclude entry of valuable medium term trial sites. It is recommended that generally any trial that has had active management for a period of 10 years or greater be classified as a long term trial site. Those users of the database can then make their own judgements as to the relevance of the trial in light of the trials and their objectives relative to the length of its operation.

## Information to be collected

There is a large amount of information that could be collected but the primary purpose of the register is to simply allow interested parties to determine what long-term trials are available and their characteristics and key treatments and provide a contact where further information can be sourced. Keeping the data requirements for the register to a useful minimum will maximise the chances of getting as many entries as possible.

## Process of data collection

Survey monkey will be used to circulate the survey and then collate the data by importing into an excel spreadsheet.

Awareness of survey will be raised by Soil Crumbs, the Soils RD&E IC members representing their agencies and institutions and by emailing a link to the survey to a list of key stakeholders in private sector, universities and the government.

## Where and how is data stored ?

It is intended that a webpage will be created within the Soils RD&E Strategy website and the data will be embedded in this page. There is also certain key soils related information registers already in existence most notably the ASRIS system maintained by CSIRO. Ensuring links to the database are located on key websites such as the ASRIS site would seem an attractive option.

## Accessing the long-term trial site register

The register won't be a true database but rather be housed in an excel document. The on-line data will be a copy of the dataset with the original being retained by the Soils RD&E Secretariat.

Users would access the register via either a scalable and clickable map (that would provide basic details) or a spreadsheet that they could sort/filter as they choose.

## Appendix 1: Proposed data fields and options

Short site name (free text – 100 characters max)

Location (nearest town, state)

Co-ordinates (S, E)

Contact person (name, organisation)

Contact details (email)

Soil type (Australian classification – order only required)

Mean rainfall (mm)

Land use type (cropping, pasture, horticulture, forestry, native vegetation, other – please specify)

Site establishment date (year)

General treatment objectives or descriptions (free text)

Is access to the site/samples/historical data still feasible or negotiable (Y/N)

Reference documents (free text - websites, reports etc. - optional)

Other information (free text and optional)

## Appendix 2: Example of info provided on zoomable map (provided by Karen Holmes)



Australian Soil Network	Meeting Number: 7
	Location: Videoconference
	Date: 25 <sup>th</sup> August 2016
AGENDA Paper	ITEM 7.9

### Budget update

The strategy requires an operating budget of approximately \$150,000 a year. Funding has been sought from members of the implementation committee. Table 1 provides a summary of the initial cash contributions. The following tables provide a rolling update to the budget position. Table 2 is the report on expenditure for 2014/15. A summary of cash contributions received for 2015/16 is provided in Table 3. Expenditure for 2015/16 is shown in Table 4. Expenditure to date in the 2016/17 year is shown in Table 5.

Table 1: Cash contributions for 2014-15 paid by member agencies

Organisation	Cash contribution
Department of Agriculture	15,000
NT DLRM	5,000
DAFWA	15,000
GRDC	35,000
Dairy Australia	15,000
MLA	10,000
GWRDC	10,000
SRA	15,000
CRDC	15,000
CSIRO	20,000
UNE	9,092
Rollover from strategy development budget	<b>\$35,616</b>
Total funds available*	<b>\$239,708</b>

\* Includes forward payment of \$40 000 from CSIRO (\$20 000 p.a. for years 2 and 3).

\*\* The initial rollover amount received by CSIRO from DoA was \$224,708; the DoA 2014/15 contribution of \$15,000 was paid later to CSIRO as a separate transaction.

Table 2: Report on expenditure (as at 30/06/2015)

<b>Item</b>	<b>Expenditure (\$)</b>
Domestic travel fares and expenses	2,179
General operating (meeting catering and room hire)	1,231
<b>Subtotal</b>	<b>3,410</b>
<b>Remaining funds balance</b>	<b>\$236,298</b>

Table 3: Cash contributions received for 2015-16 by member agencies (NB: CSIRO contributions of 20,000 for 2015-16 were prepaid in 2014-15).

<b>Organisation</b>	<b>Cash contribution (\$)</b>
GRDC	35,000
Dairy Australia	15,000
MLA	10,000
SRA	15,000
CRDC	15,000
RIRDC	15,000
DAWR	15,000
Northern Territory DLRM	5,000
Wine Australia	10,000
Tas DPIPWE	3,000
SARDI	2,500
Carry forward from 2014-15	236,298
<b>Total funds available</b>	<b>\$376,798</b>

Table 4: Report on expenditure (2015-2016 year, 30/6/2016)

Item	Expenditure (\$)
Domestic travel fares and expenses (exec officer, strategy leadership)	2,649
Operating (meeting catering, document preparation, comm's)	1,457
Executive Officer salary (0.4FTE, 12 months from 23 Feb 2016)	60,000
Annual forum (venue, accommodation, catering)	8,447
Annual forum consultant costs	24,346
Website development	1,927
<b>Subtotal</b>	<b>98,826</b>
<b>Remaining funds balance</b>	<b>\$277,972</b>

Table 5: Report on expenditure (2016-2017 year, to 31/7/2016)

Item	Expenditure (\$)
Executive Officer salary (0.4FTE, 6 months)	30,000
Outlook Conference sponsorship	8,182
<b>Subtotal</b>	<b>38,182</b>
<b>Remaining funds balance</b>	<b>\$239,790</b>

### Key issues

- There is significant funding available to progress Australian Soil Network activities.
- Consideration needs to be given to approval for use of funds to support such activities.
- Member contributions for 2016/17 financial year will be sought as part of our annual process.

### Required action

- Note the current budget and expenditure.
- Anticipate request for 2016/17 member funds contribution.

### Resource implications

- As shown above

### Preparation and consultation

- Secretariat and members.

### Attachments

- None