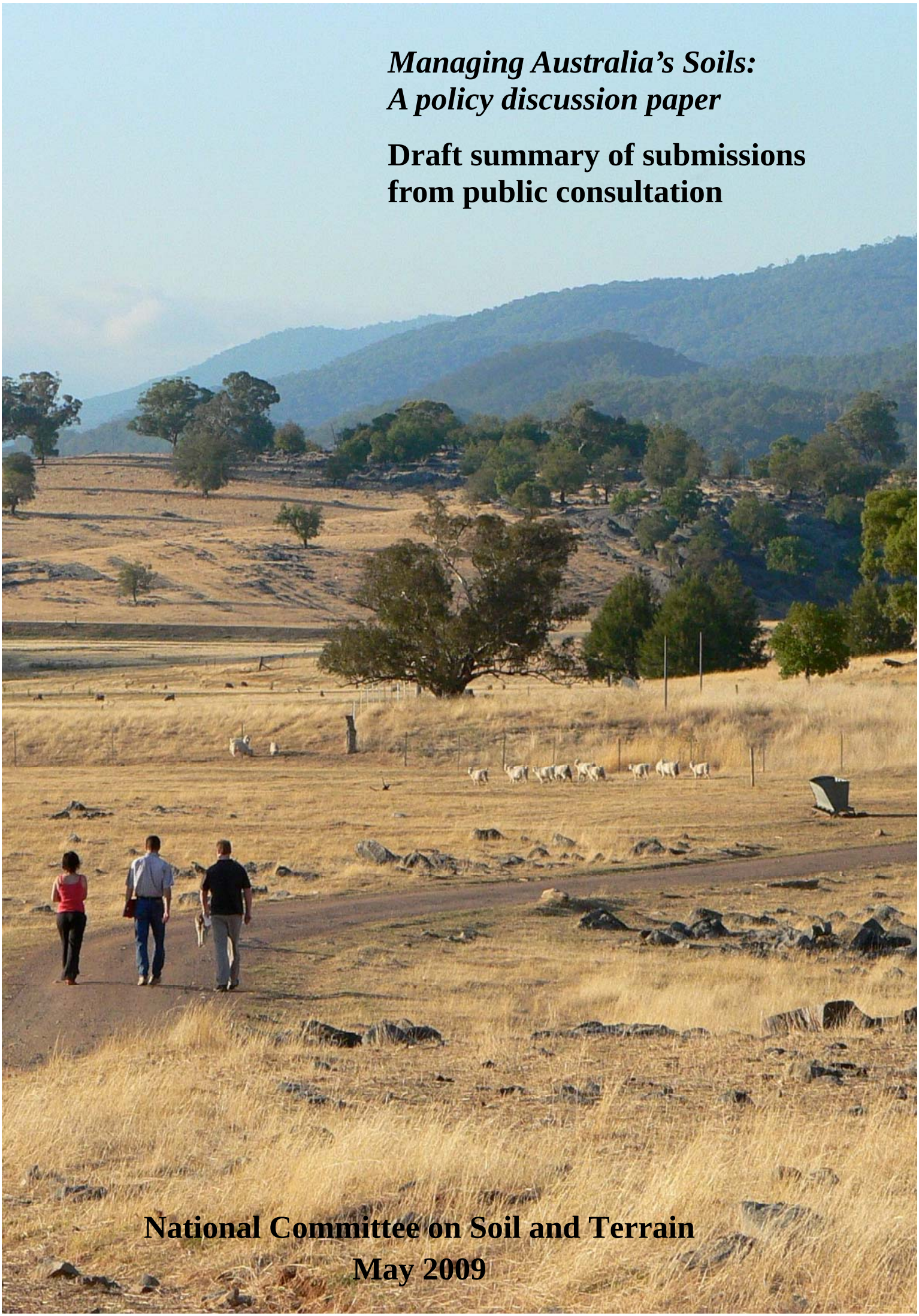
Managing Australia's Soils:
A policy discussion paper

Draft summary of submissions from public consultation



National Committee on Soil and Terrain
May 2009

Note
This report contains a summary of the key points from all submissions. Many submissions provided extensive and very useful information which was too large to be presented in full in this report.

Managing Australia's Soils: A policy discussion paper

Summary of submissions from public consultation

National Committee on Soil and Terrain

May 2009

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Executive Summary

In 2006, The National Committee on Soil and Terrain (NCST) requested agreement from the Natural Resource Policies and Programs Committee (NRPPC) to develop a strategic approach to managing Australia's soil and land resources.

In October 2008, the 83-page discussion paper, *Managing Australia's Soils: A policy discussion paper,* prepared by Andrew Campbell, was sent to approximately 450 stakeholders for comment.

Overall, the response to the Paper was positive and encouraging, with 101 submissions received from a broad range of stakeholders. This level of response was regarded as very satisfactory given the length of the discussion paper and the requirement to complete 11 guiding questions.

Many stakeholders congratulated the National Committee on Soil and Terrain on the release of the Paper, indicating it was long overdue.

The principal response from submissions demonstrated strong support for a strategic approach to soil management in Australia. The suggested mechanisms to achieve this approach were variable, with suggestions for a national soils policy and a national soil framework. There was a clear message that any approach should be integrated with other natural resource management issues such as water and vegetation management. The need for improved consideration of soil in wider debates on climate, biodiversity and future food security was identified.

There was broad agreement on the need to build a case for strategic reinvestment in soils. Stakeholders saw a need for more research, particularly in the areas of soil biota, soil carbon, sustainability in soil management, and practice change.

Stakeholders consistently identified the need for improved soils information including monitoring, collection, storage and access to data. The Australian Soil Resource Information System (ASRIS) was identified as a core national resource in need of on-going investment with recommendations that state based information should be linked to the website.

The low level of community awareness and understanding of threats to soil resources and the long-term consequences of this was recognised.

There is strong awareness of the growing lack of soils professionals with sufficient skills to interpret and apply soil information. Stakeholders stressed the need for specialist and local soils knowledge in the areas of soil classification and interpretation to support improved management practices leading to more sustainable use of soils.

The lack of adequate people on the ground was frequently attributed to the ageing and retiring of soils specialists and the problems of universities being unable to maintain critical mass in soils courses. The lack of skilled soils people was also seen as a future threat to properly informed soils and land management policy development.

Respondents identified a strong need to promote soils literacy through the NRM regional bodies. This would provide the opportunity to promote on-ground, local outcomes and to improve collaboration between landholders, NRM bodies and state / federal agencies.

The issue of training, extension and communication as a key element in developing management practice change towards more sustainable soil management was strongly supported.

Ways forward

Key suggestions included:

- a national strategic approach to manage future threats to the national soil resource
- increasing research and development on soil health
- improving national soils skills and knowledge bases
- improving soil information and data management
- improving education and extension capacities to support practice change and
- improving public awareness of critical soil management issues.

Introduction

The National Committee on Soil and Terrain (NCST) requested agreement from the Natural Resource Policies and Programs Committee (NRPPC) in 2006, to develop a strategic approach to managing Australia's soil and land resources.

In early 2007, the NRPPC commissioned the development of a discussion paper for public comment. The paper was to summarise the key soil management issues and opportunities in Australia. The Department of Agriculture Fisheries & Forestry funded the development of the paper and the consultation process providing $70,000 from the national component of the Landcare Program.

Triple Helix Consulting (Andrew Campbell) was commissioned to develop the paper, in consultation with members of the NCST. The NRPPC and sub-committees of the Primary Industries Standing Committee also provided comment on drafts. Andrew Campbell is the primary author and a disclaimer in the paper indicates that the views may not be shared by any or all the members of the Natural Resource Management Standing Committee, including the Australian Government.

The 83-page discussion paper, *Managing Australia's Soils: A policy discussion paper*[1] (the Paper) indicates the fundamental role soil has in food production, the carbon and water cycles and the importance of sustainable soil management. It summarises a range of current key soil resource and management issues in Australia, including:

- the sustainability of current land use systems and soil management practices
- soil information and monitoring
- research effort
- knowledge base/s
- connections between soil management and climate change and water issues
- soil degradation processes
- demand for food security from a growing population.

The Paper was released for public comment on 8 October 2008 with guiding questions, for a two-month public consultation period to December 2008.

To engage a broad range of opinions and comments, and recognising that soil is largely a privately owned resource, the Paper and guiding questions was circulated to approximately 450 stakeholders who have a role and responsibility for managing Australia's soil resource base.

Apart from a targeted mail out the Paper was also made available on the Australian Collaborative Land Evaluation Program website that is managed by the Commonwealth Scientific and Industrial Research Organisation.

[1] 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).

Response Rate

One hundred and one submissions were received from the public consultation period, across the 12 categories of stakeholders[2].

The breakdown by stakeholder category of the 101 submissions received on the Paper is outlined in Figure 1 and the actual numbers is outlined in Table 1.

Figure 1: The total number of submissions received by stakeholder category.

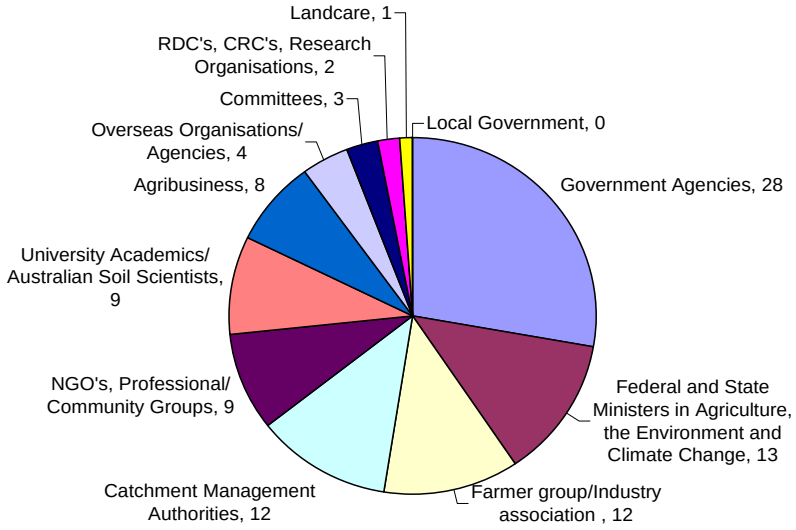


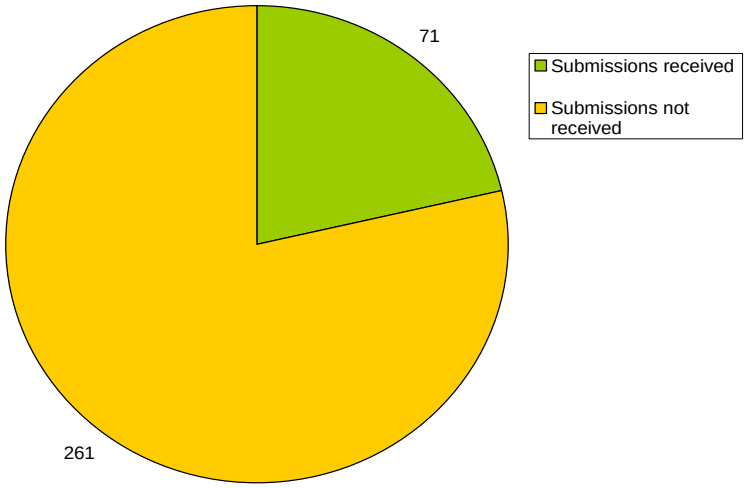
Table 1: The total number of submissions received by stakeholder category.

Stakeholder category	**No. of responses**
Government Agencies	28
Federal and State Ministers of Agriculture, Environment and Climate Change	13
Farmer groups/Industry association	12
Catchment Management Authorities	12
NGOs, Professional and Community groups	9
University academics/ Australian Soil Scientists	9
Agribusiness	8
Overseas organisations/agencies	4
Committees	3
Research and Development Organisations/CRC's	2
Landcare groups	1
Local Government	0
Total	**101**

The Paper was directly mailed to 328 stakeholders - 71 provided a submission and 261 did not (Figure 2). This is a response rate of 21.6%.

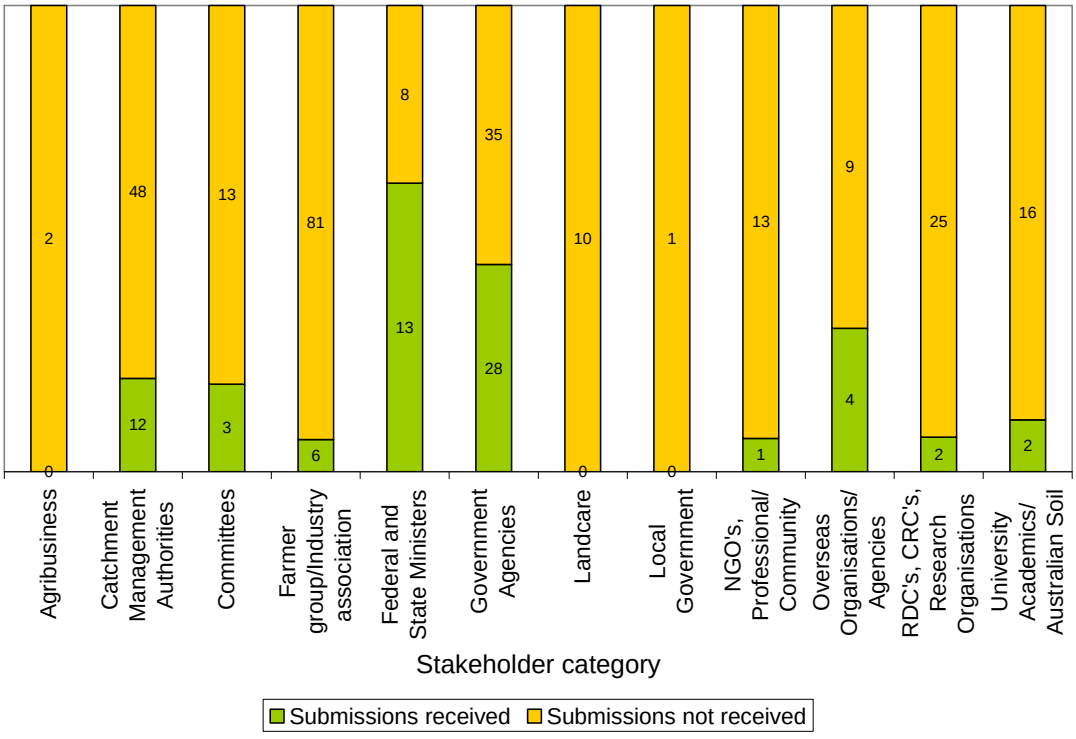
[2] The stakeholder categories were determined by the NCST

Figure 2: The number of stakeholders who received the Paper directly and who did and did not provide a submission.



Across the 12 categories of stakeholders who received the paper directly the Federal and State Ministers, government agencies and overseas organisations provided the highest response rate.

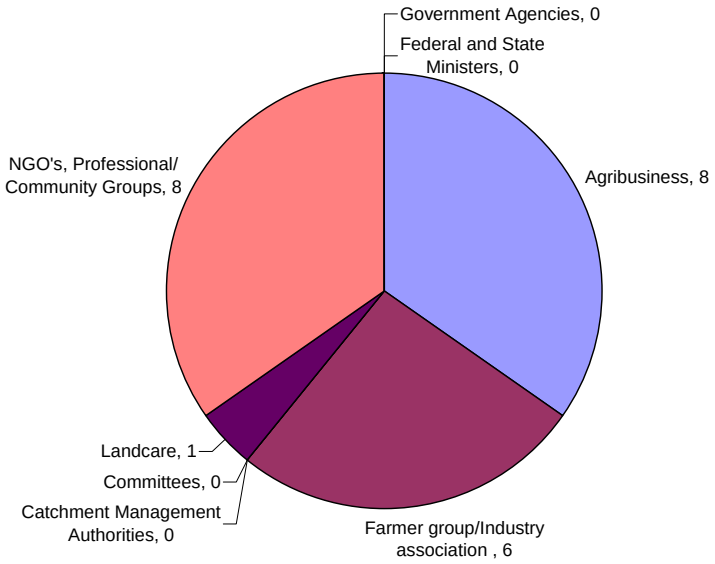
Figure 3[3]: The number of submissions received and not received from stakeholder groups that received the Paper directly via the mail out.



There were 34 submissions received who did not receive the Paper directly via the mail out to various stakeholders (Figure 4).

[3] Note: this Figure does not include stakeholders that did not receive the Paper directly but did respond

Figure 4: The number of submissions from stakeholders (per stakeholder category) who did not receive the Paper directly.



Methodology

Guiding questions were distributed with the paper to stakeholders to guide feedback on the paper.

Stakeholders were asked to provide a score against specific questions, provide a written response to questions and open comment was encouraged.

The scoring system was from 1 (strongly agree) to 5 (strongly disagree). A score of 3 was taken as neither agreeing or disagreeing.

Where a written comment was received these were summarised per question therefore a level of interpretation has been used by the collators. If comments were not against specific questions then their comments have been summarised in a section ‘unstructured comments’.

Question 1 – A strategic approach to soil management

Do you or your organisation support the need for a strategic approach to soil management?
The question focuses on whether there is the need to develop a national framework and policy for the protection of soil and preservation of the capacity of soil to provide economic, environmental, social and cultural functions. This would be a coordinated approach that involves all levels of government in partnership with industry, academia, landholders and the community.

Quantitative responses
The majority of stakeholders strongly supported the need for a more strategic approach to soil management (Figure 5, Table 2, Figure 6).

Figure 5: Respondents support for the need for a strategic approach to soil management.

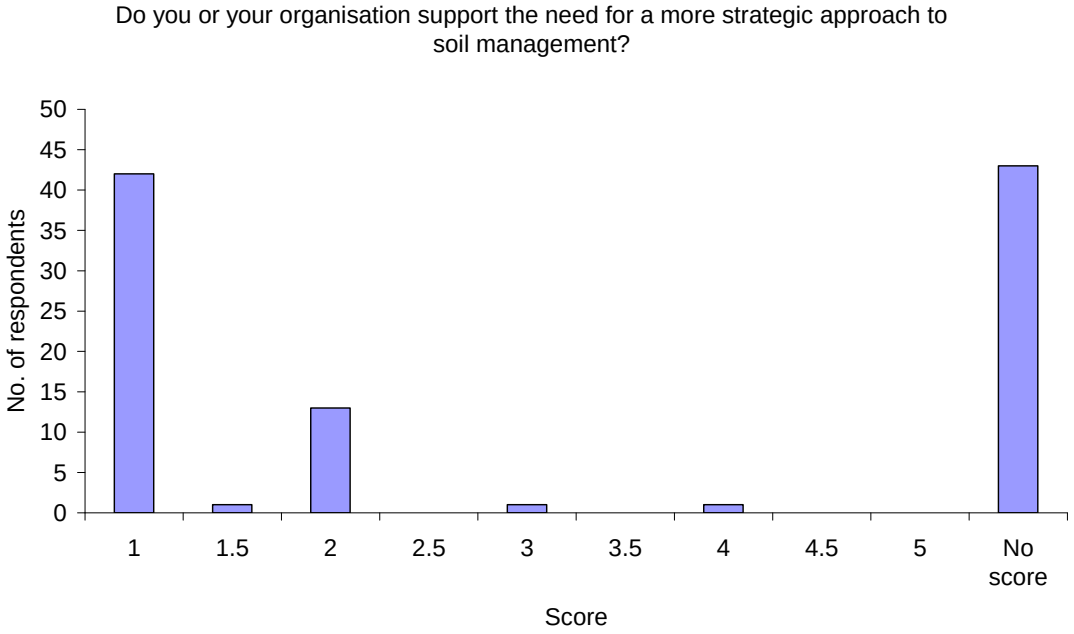
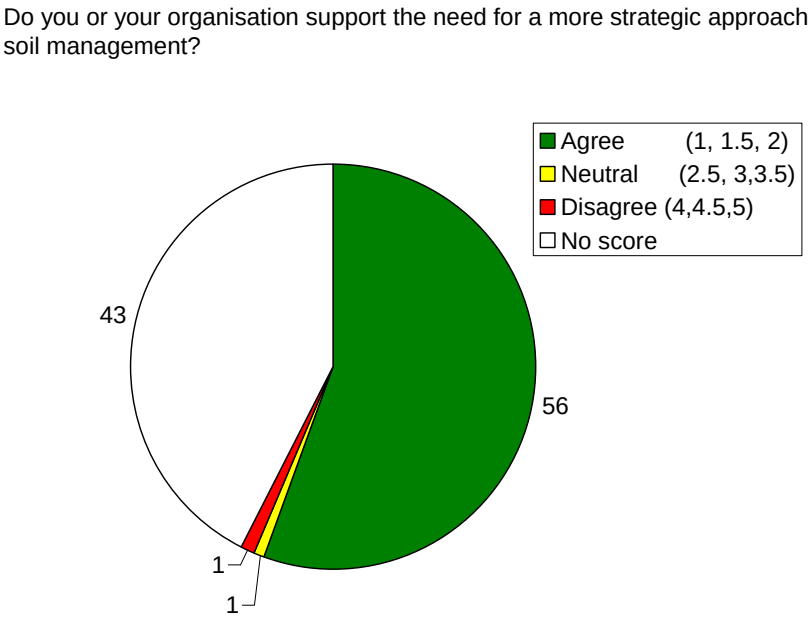


Table 2: Respondents support for the need for a strategic approach to soil management.

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	58	42	1	13	0	1	0	1	0	0	43

Figure 6: Respondents support for the need for a strategic approach to soil management.



Qualitative responses[4]

Agribusinesses

The three agribusinesses were supportive. One respondent indicated that soil management requires a national coordinated, connected approach that goes beyond state border issues and one that soil policy has been neglected. One commented that an approach is needed that both respects farmers as 'guardians' of the soil but also links the urban community to the rural community as the return of nutrients to the farm is fundamental (e.g. city to soil project, Goulburn NSW, incorporates clean, agricultural and industrial organic products and waste waters).

Catchment Management Authorities

All nine responding catchment management authorities were supportive. Two responses endorsed a national approach with one indicating they would like to be able to link their regional approach to a state and national approach. One response specifically noted the need for a national framework and policy.

Other responses indicated the need to link soils management to wider natural resource management issues, the need for better soils information on soil type and land use, better integration of research, development and extension in different programs and the need to raise communication and capacity/provide education in this area.

Committees

There was one committee response, which was supportive but noted the need for mechanisms to implement policies and frameworks in this area.

[4] Note: not all stakeholders provided a written response

Farmer groups/industry associations
The eight respondents were supportive. A respondent indicated that a strategic approach would improve access to new information to maximise the ability for farmers to make timely cost effective decisions and policy makers to have access to data to help identify areas of concern e.g. 'top ten' regional actions with COAG to coordinate. Other respondents agreed with the need for grass roots on ground approach. Market imperatives were noted as important and should be integrated into policy and actions.

One industry associated noted that their organisation is already working to promote a strategic approach to soil management through the Queensland Soil Health Partnership. Other responses indicated a need to better coordinate RD&E, that soil and terrain disciplines need to adopt a common language, and the need for an approach to be based on the purposes for which soils are managed (i.e. farming and ecological systems that can deliver national outcomes).

The importance of linking soil management to a wider food policy was raised as a particular states industry view.

Government agencies
Of 17 government agencies, 11 expressed support for a more strategic approach to soil management. Three agencies noted that such an approach should be integrated with broader natural resource management issues and land use planning. Three agencies indicated that better coordination and communication between national and regional bodies, academia and on the ground people will be essential and the need for national coordination of roles and responsibilities. Two agencies noted that the best approach would be at state/regional scales.

A total of four agencies expressed specific support for a national framework, while one agency commented that a national framework would not necessarily improve soil management. One agency indicated the need for a national framework and policy and one agency a soil strategy.

It was also indicated that a strategic approach would need to link to other relevant policies e.g. RDE framework and the emerging Sustainable Agriculture Framework, and feed into regional plans and align with existing state policy.

Ministers
One minister indicated support for a national framework as a basis for improving strategic approaches to managing soils in a changing climate to address issues such as conservation, rural leaseholds and urban planning.

NGOs, Professional and Community Groups
The three respondents were all supportive. Two responses indicated the importance of involving landholders as drivers of a national approach.

Overseas organisations/agencies
The sole respondent here was supportive and highlighted land management issues as a high priority for their organisation.

RDCs, CRCs, Research and Development Corporations
Both respondents were supportive, one seeing the potential for collaboration and reduction in fragmentation, and the other the opportunity for strategic soil management to meet wider issues, including food security and NRM issues.

University Academics/State Soil Scientists
The five respondents were supportive. Three respondents indicated that a long-term plan was essential, a coordinated approach would reduce duplication in government programs with similar goals and one of these respondents was promoting a national approach underpinned by good science rather than a state approach.

It was indicated that the loss of soil conservation departments has created problems for farmers, soils is now largely being ignored in favour of water security and biodiversity and there is a need to educate the people about economic and health affects through reduced quality in soil and water resources.

Question 2 – Perspectives provided in the Paper

Is there overall support for the perspectives provided in the discussion paper? This question is asking your agreement, or otherwise, with the analysis in the paper on the current policy and delivery framework for soil management. We are also asking for the identification of areas in the paper where there is no support.

Quantitative responses

The majority of stakeholders agreed with the perspectives in the paper with two disagreeing (Figure 7 and Table 3, Figure 8).

Figure 7: Respondent scores relating to support for the perspectives provided in the Paper.

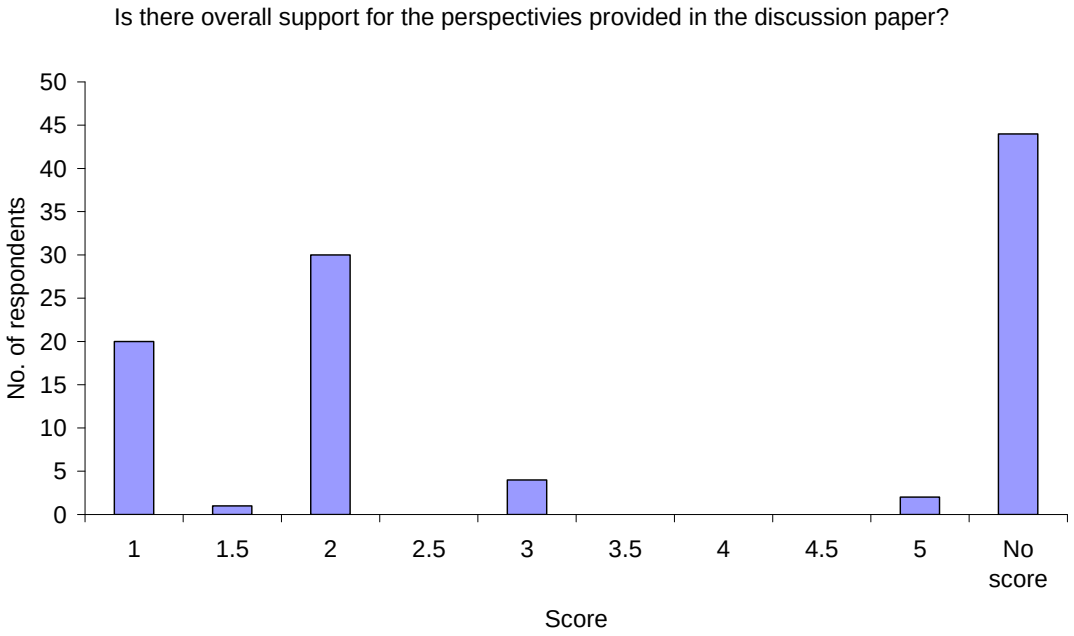
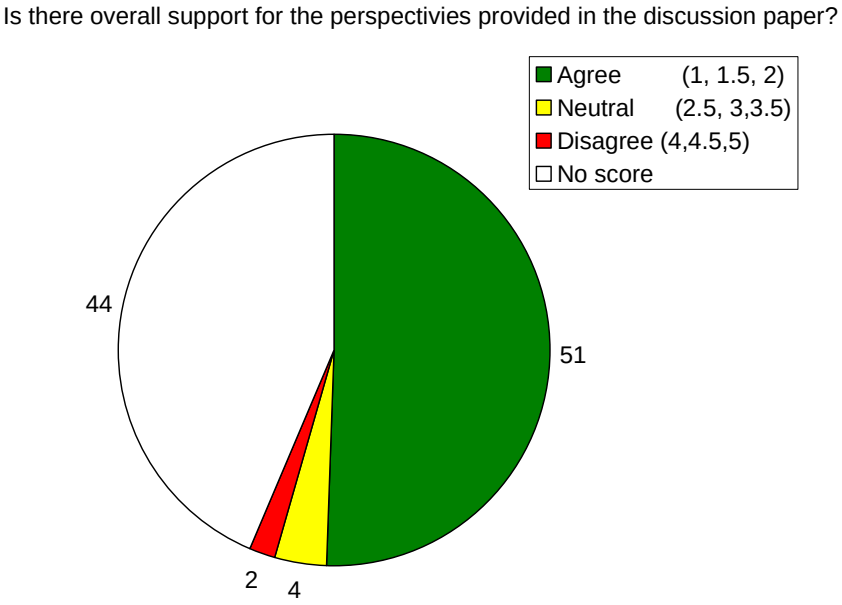


Table 3: **Respondent scores relating to support the perspectives provided in the Paper**

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	57	20	1	30	0	4	0	0	0	2	44

Figure 8: Demonstration of the proportion of respondents who agreed, were neutral or disagreed with the perspectives provided in the Paper.



Qualitative responses

Agribusinesses

The two respondents agreed that soil management needs to become more strategic. One submission suggested that this could be achieved by including a community partnership program to use organic waste in agriculture as a process to provide engagement, responsibility and political support.

Catchment Management Authorities

Eight catchment management authorities were supportive. There was agreement that soil is a key asset within an integrated NRM approach, soils needs to be protected, there has been a decline in professional soil capacity however, the paper needed to look at active improvement rather than just degradation and remediation.

Suggestions include targeting the needs of individual landholders, the need for commitment to long term monitoring and collection of data so it can be used for different purposes and that generic resource condition targets may compromise benefits at a local level.

Committees

The sole respondent was supportive and noted that landowners were looking for advice on soil management.

Farmer groups/industry associations

The nine respondents were generally supportive of the perspectives provided in the Paper. Two submissions however, were critical that some of the views presented were traditional, generally negative, and introspective and reflected traditional thinking in soil science. In addition, the two submissions suggested the need for more recognition of the advances in soil science over the past 20-40 years. In addition, two submissions

noted there needed to be greater emphasis on recent achievements, citing current work on soil salinity and acid sulfate soils.

As part of a national approach, one respondent noted that there should be no added regulation or increased compliance costs and that there needs to more emphasis on the role that industries can play in driving research and engaging with land managers.

A better understanding of soil ecology, RD&E and increasing the numbers of skilled soil practitioners was mentioned by two respondents. More integration of biological-oriented soil science and farming practices was suggested by one submission. Another submission supported this approach suggesting that a national strategy should begin with a soil management perspective, rather than a focus on problems caused by management.

One submission included the need for more emphasis on the links between food production and the impacts of agriculture on the landscape. This was supported by another submission suggesting that farmers need impartial advice regarding fertilisers. One respondent looked at incentives for landholders to fast-track immediate on-ground change.

Government agencies
Fifteen government agencies responded, with all supportive apart from one neutral response. Among the supportive responses, one agency noted their support was only 'in principle' and that similar arguments could be made for other natural resources.

Seven agencies stressed the need for an integrated approach, linking soils to other NRM issues and landscape management. One submission suggested that there needs to be a more effective national discussion on emerging trends in land management and land capacity.

Two respondents were supportive of improved knowledge in the role and storage of soil organic carbon and for an analysis on the links to soil management and the provision of ecosystem services in agriculture. One respondent noted the need for caution in regard to assumptions about the potential of soil carbon, suggesting it may be unfeasible in an open carbon market. Two submissions noted the impact of scale in soil management with one suggesting that a holistic approach would include scales from local to national while the other suggested that landscape scale assessment is critical.

Ministers
The sole respondent linked sustainable soil management with biodiversity, ecosystem function, optimal primary production (food security), ameliorating and preventing soil degradation, and soil as an archive of human and natural history.

NGOs, Professional and Community Groups
The three NGOs were supportive, but two suggested the need for more emphasis on innovations in biological and organic farming practices, including exploring advances in soil biology. One respondent noted that a coordinated approach to soil management should incorporate the views of resource managers and not focus solely on the soil.

Overseas organisations/agencies
Both overseas agencies were supportive; one noted that the paper aligned with the UN Convention to Combat Desertification.

RDCs, CRCs, Research and Development Corporations
The sole respondent was neutral and noted that the role of RDCs needed to be strengthened and the role of industry R&D needs to considered more closely.

University Academics/State Soil Scientists
There was general support from the six respondents, but one objected to the criticism of one of Australia's leading soil science organisations and the other critiqued the training options paragraph.

One submission noted that farms should be re-designed for resilience, while another noted the need for community involvement. This was supported by a suggestion from one respondent that treated urban waste should be provided to farmers as a soil conditioner.

One respondent was very supportive of a stand-alone national soils agency, including a new R&D program, another did not feel there was a need for a new, permanent monitoring agency. Another submission suggested that more emphasis should be placed on extension, training and education in soil management and another noted that there needs to be more coordination in the types of soils research being undertaken to avoid duplication.

Question 3 – Roles and responsibilities for managing Australia's soils

What is your role and responsibility for managing Australia's soils?
This question is to gain an insight into the different roles and responsibilities played by stakeholders in managing Australia's soils. This will raise awareness of the critical role stakeholders play.

A number of stakeholders provided a response to this question and the responses have been summarised as per the stakeholder categories below **Table 4**.

Table 4: The roles and responsibilities of stakeholders involved in soil management in Australia.

Stakeholder Category	Roles and responsibilities for soil management
Agribusiness	• Soil consultants • Promoting holistic farming systems and innovations • Soil sampling and monitoring, advice on soil amelioration • Accreditation/certification for organic/biodynamics • Manufacturing organic supplements • Biological product trials • Providing advice to growers on soils • Workshops, talks and training courses • Environmental management consultation services
Catchment Management Authorities	• Research and extension • On-ground works • Implementation of NRM legislation and programs • Assessments of land clearing applications • Education and information • Action plans and incentives for land managers • Addressing soil processes within catchments • Compliance/enforcement of duty of care • Regional plans with MCTs • Meeting benchmarks in regional catchment strategies
Committees	• Coordinating national NRM activities
Farmer groups/Industry associations	• Organic certification • Agronomy services • National farming body • Research and development • Link to Australian Institute Agricultural Science and Technology • Involved in supporting Murray Darling Basin irrigation activities • Manage environmental programs • Links to ASSSI
Government Agencies (including local, State, Territory and Commonwealth)	• Research, development and extension • Improve production and environmental outcomes • Provide soils information material • Rural and peri-urban leasehold management • Education and training • Monitoring and reporting on soils for program performance

	• Statutory responsibility for agricultural resource base • Policy development • Custodians of soils information/databases • Capacity-building, science leadership, community-led work and on-ground work • Coordination of information for reporting • Regional ecosystems mapping • Sustainable farming in climate change • Research, extension and development activities for plant industries • Recommending farming practices to growers • Road construction to minimise erosion • Managing water catchments and public land • Overseeing Land Management Agreements • Encouraging management action targets (MCT's) and resource condition targets (RCT's) • Encouraging use of decision support tools • Preparing NRM plans
NGOs, Professional and Community Groups	• Highlighting soils for local activities • Extension (at regional level) • Raising public awareness • On-farm research programs • Forums and training for soil scientists • Soil/agronomy consultants
Overseas Organisations/agencies	• Increasing knowledge of soils internationally • Global soils mapping • Agronomic soil and plant analysis
Research and Development Corporations/CRC's	• Investing in research, development and extension
University academics/Australian Soil Scientists	• Link to Accreditation board of Certified Professional Soil Scientists • Link to Australian Society of Soil Science Incorporated and International Union of Soil Sciences • Research on integrating ecology and agronomy/cropping advice • Providing education and research in soils • Trialling agricultural management methods

Question 4 – Stakeholders needs in managing Australia's soils

What do you need to assist you in meeting your interests in managing Australia's soils?
This is about what you need, as a stakeholder having a role and responsibility in managing Australia's soils. The discussion paper highlights a number of areas that need improvement; however, we would like your perspective on the current or future impediments to meeting your goals.

Qualitative responses

Agribusinesses
There were five respondents in this category, and two mentioned the need for more information on the latest R&D developments and government programs. This was supported by another respondent who noted that a secure funding base will be required to cover program costs and that 'best practice' approaches to soil management must be supported by all levels of government.

One respondent supported a more coordinated approach, with another suggesting that landholders must be included at a collective/cooperative level, supported by TAFE education programs that include soil management. One respondent suggested that catchment-scale involvement by NRM boards would engage small-scale landholders. One submission highlighted the need to include economic and ecological paradigms on climate, water and food debates.

Catchment Management Authorities
There were ten respondents in this category. Five respondents mentioned the need for more knowledge on soils, with a sixth noting the need for more research.

One respondent noted that information needs included the need for secure storage and access to long-term soils data.

Two respondents expressed a need for more training and education, two respondents mentioned the need for adequate resourcing, and two mentioned the need to engage stakeholders such as landholders. Two respondents advocated a framework, one of these noting the need to integrate soils with wider issues and the other noting that a national framework could reduce duplication in planning.

Committees
The respondent identified the need for long-term commitments of funding and resources from government, industry and the community.

Farmer groups/industry associations
The nine respondents gave individualised responses, mentioning biological and organic approaches, focusing research and development on soil biota and integrating soils with wider NRM issues.

One respondent noted their Soil Health Partnership as an example of an approach that supports growers in managing soil erosion and degradation. Another respondent highlighted the need for genuine and collaborative partnerships between industry, government and researchers.

Two respondents emphasised the need for innovative methods including a systems thinking approach to soil management. One respondent highlighted the gaps in soil health indices that were identified in the National Land and Water Resources Audit (2002), and suggested that R&D is urgently needed on the soil biota to identify the health status of soils. This was supported by two respondents who suggested standardised indices on soil health and for measuring soil carbon. One respondent noted that there is a need to make soil science more understandable to lay people to foster community participation, and another respondent suggested that there needs to be more education in soil management. One submission suggested the provision of incentives to maintain stewardship and reduce costs to consumers.

Government agencies
There were 18 respondents in this category. Nine agencies mentioned the need for better soils information, stressing the need for databases and five of these noted the need for spatial information, with three connecting this to mapping soil capabilities against patterns of land use. The need for monitoring was raised by three agencies, with targeted monitoring being suggested by one of these. The need to expand and upgrade the Australian Soil Resource Information System (ASRIS) was mentioned by one.

The need to constrain land use planning was also noted by another agency, which saw a national framework as a constraining method.

Five agencies mentioned the need to connect soils to wider issues such as biodiversity, food production or natural resource management. Enhanced research was mentioned by three agencies, and the need for additional soils experts was mentioned by two agencies. Engaging landowners and raising community awareness was mentioned by three agencies (including duty of care), with incentives for landowners mentioned by one of these. Greater funding and investment was mentioned by two agencies.

Local Government
There were no responses in this category.

Ministers
The respondent suggested that there is more information needed on land condition and degradation to match soil type, land use and land capability. To allow an analysis of trends over time, it was suggested that the ASRIS database requires renovation and will need to be supported by a Commonwealth funded training program.

NGOs, Professional and Community Groups
There were three respondents. One submission emphasised the need for innovative approaches including organic and biological farming methods and noted that they should be underpinned by applied research.

One submission highlighted the need for soils to be included in the broader NRM and the need for information on the relationships between soil health, Water Use Efficiency and tillage practices. It was also indicated that there is the need for independent soils advice with a suggestion that more web-based state specific information could be linked to the ASRIS database. One respondent highlighted the need for more soils information generally and the need for more skilled soils graduates.

Overseas organisations/agencies
Two respondents indicated that their agency would be interested in further discussions with the NCST, one mentioning the need for evidence-based government policy.

RDCs, CRCs, Research and Development Corporations
The sole respondent suggested the need for analysis, which builds on the work of the National Land and Water Resources Audit (2002).

University Academics/State Soil Scientists
There were six respondents in this category, with two agreeing that more support was needed for research, two suggesting the need for a comprehensive national soils database and one supporting the need for a national soils policy.

One submission identified that more government funding is needed to address the declining coordination of soils education. One respondent suggested that government assistance is required and is also seeking representation on the NCST. One respondent identified the links to soil management and the provision of ecosystem services.

Question 5 – Strategic reinvestment for Australian soils

Do you believe there is a need to build a case for strategic reinvestment in soils? Would you contribute to this process?

5a. *Do you believe there is a need to build a case for strategic reinvestment in soils?*

Quantitative responses

The majority of stakeholders strongly agreed / agreed that there is a need to build a case for strategic reinvestment in soils (Figure 9 and Table 5). This is also summarised in Figure 10.

Figure 9: Demonstration of support for the need to build a case for strategic reinvestment in soils.

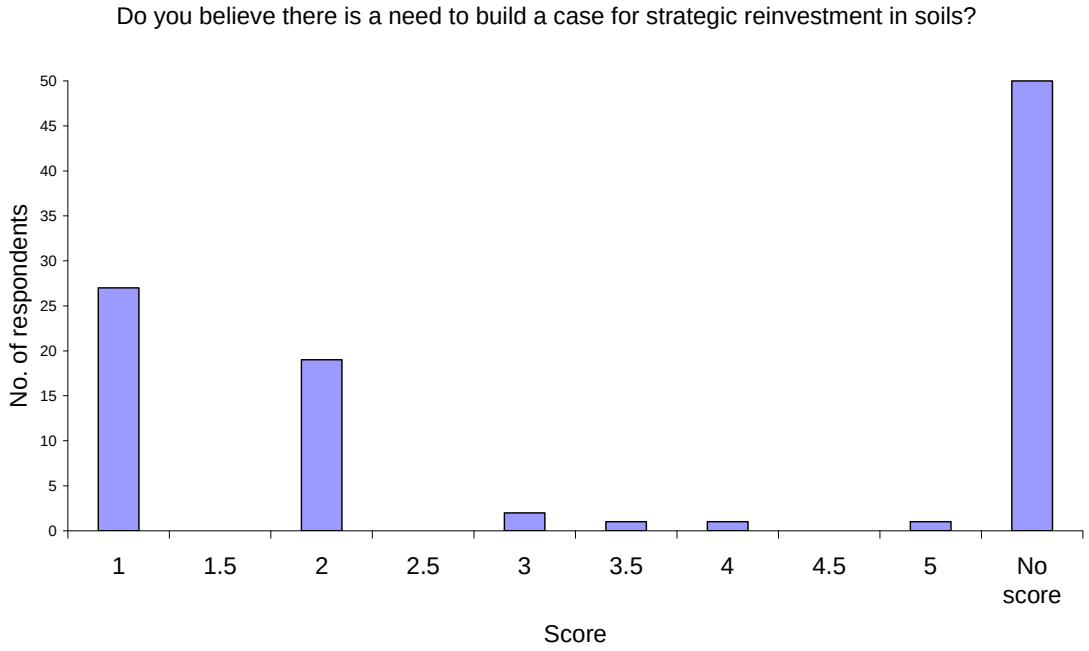
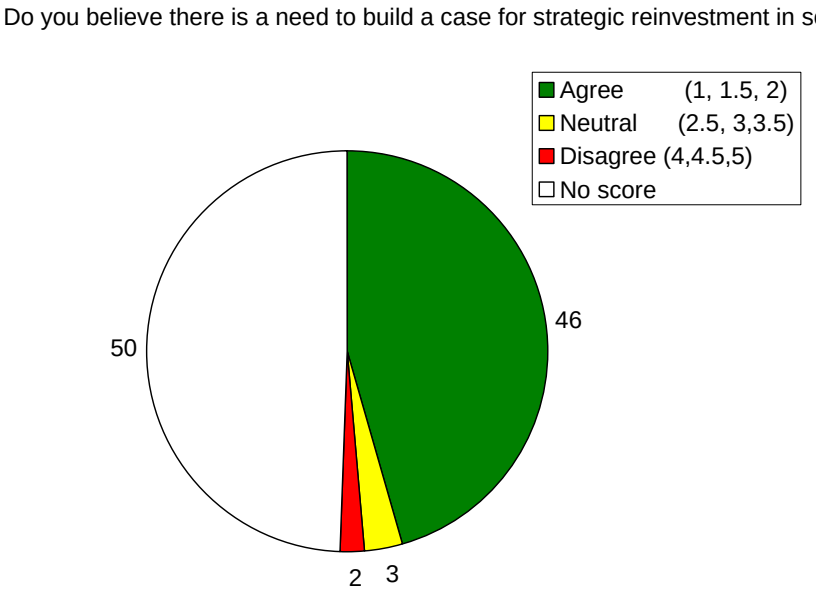


Table 5: Respondent scores relating to their support for the need to build a case for strategic reinvestment in soils.

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	51	27	0	19	0	2	1	1	0	1	50

Figure 10: Demonstration of the proportion of respondents who agreed, were neutral or disagreed with the need to build a case for strategic reinvestment in soils.



Qualitative responses

Agribusinesses

Three agribusinesses were supportive. One respondent noted the need to manage the health of the land as an integrated whole. Another indicated that their organisation was already contributing to strategic reinvestment in soils.

Catchment Management Authorities

All seven catchment management authorities who responded were supportive. Individual reasons given included food security and environmental concerns and the need to manage soils data.

Committees

The respondent was supportive, suggesting linking soils to water quality and biodiversity, and promoting soil carbon.

Farmer groups/industry associations

The one respondent in this category was supportive of government funding of research and development in soils, while another was not because this respondent believed that soils should not be focused on in isolation, but looked at as part of whole of landscape management. A third indicated that there is only a need for a database which all state agencies can contribute.

Government agencies

Of the 11 government agencies, nine were supportive, with two agencies noting a need to link soils to existing national frameworks. One agency noted that a similar case could be made for other natural resources.

Ministers
One Minister commented that resource costs and efforts need to be shared across institutions and agencies with the Commonwealth taking the lead role in allocating resources and that contribution should be calculated on the land area basis rather than population size.

NGOs, Professional and Community Groups
The respondent was supportive.

Overseas organisations/agencies
The respondent was supportive but warned private ownership would hamper this.

RDCs, CRCs, Research and Development Corporations
There were no respondents in this category.

University Academics/State Soil Scientists
All four respondents were supportive, two of which indicated they would contribute through their organisations or universities or training courses and research.

***5b**. Would you contribute to this process of strategic reinvestment in soils?*

Qualitative responses

Agribusinesses
Three respondents indicated they would contribute to strategic reinvestment in soils, with one stressing the need for on-ground changes and/or grass roots involvement.

Catchment Management Authorities
All six respondents were supportive, with two indicating the need to link soils to wider natural resource management issues. One CMA requested feedback on the ways that they can contribute, with one other indicating a willingness to form partnerships to achieve this.

Committees
There were no responses in this category.

Farmer groups/industry associations
The five respondents all indicated that they would contribute to the process of strategic reinvestment. One respondent indicated willingness to help in training, standard setting and auditing, with another offering volunteer contributions.

Two respondents supported a national soils policy to support existing networks and to capitalise on the links between soil management and production activities. One respondent highlighted the need for strategic knowledge building and development of career paths for skilled soils practitioners through government and industry partnerships. Another respondent held concerns that big business should not be involved in community awareness raising and suggested that chemical companies should contribute towards funding restoration of soil biodiversity.

Government agencies
All eight agencies indicated a willingness to contribute to the process. Contributions of expertise were mentioned frequently (four responses), with data sharing and facilitation of discussions also mentioned. One respondent indicated support during the developmental stages of a potential strategy while another suggested that resources should not reduce investment in other areas of NRM. One agency suggested reinvestment is needed to develop and review soil-mapping systems, data collection tools, manuals, guidelines, technical standards and specifications.

Local Government
There were no responses in this category

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The two respondents were supportive, .with one promoting biological farming practices above no-till approaches to build soil carbon levels. A bottom-up approach including landholders was also supported by this respondent.

Overseas organisations/agencies
There were no responses in this category.

RDCs, CRCs, Research and Development Corporations
The sole respondent indicated willingness to help build a case for strategic investment.

University Academics/State Soil Scientists
The four respondents were supportive and one respondent suggested that reinvestment in the leading soil science agencies is vital to the long-term outlook for Australia's soils. .

Question 6 – A cost-effective monitoring system of soil condition

Do you support the suggestions put forward to gain a cost-effective monitoring system of soil condition in Australia (p.49 of discussion paper)? Are there any changes you would make to this list? What is most critical to you, as a stakeholder, to rebuilding the knowledge base in soils in Australia?

Quantitative responses

The majority of stakeholders strongly agreed/ agreed to a cost-effective monitoring system of soil condition (Figure 11, Table 6, Figure 12).

Figure 11: Demonstration of support to gain a cost-effective monitoring system of soil condition in Australia.

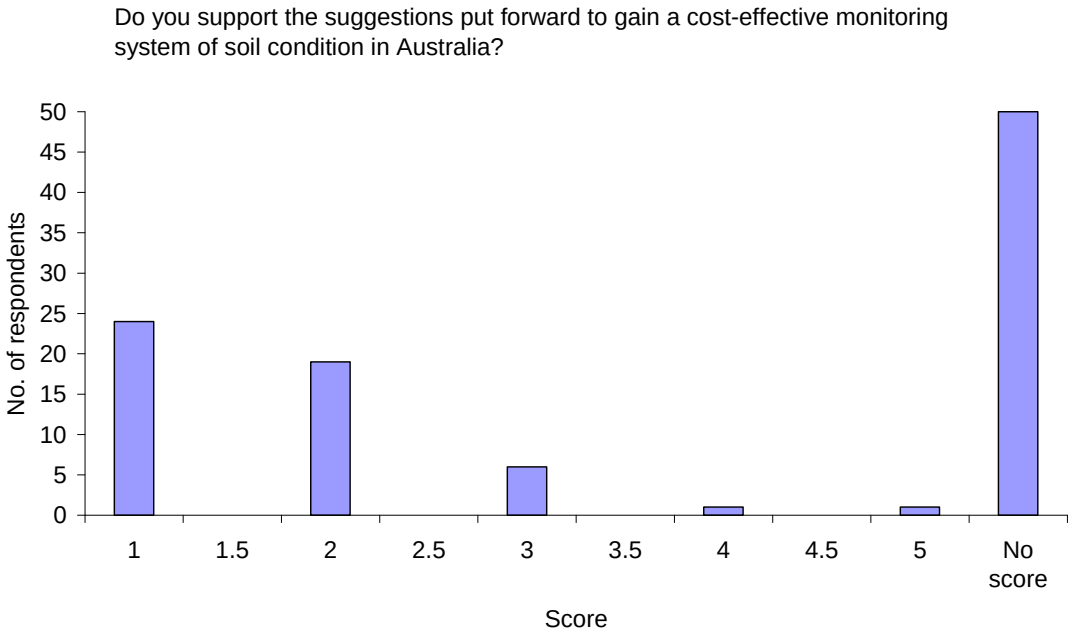
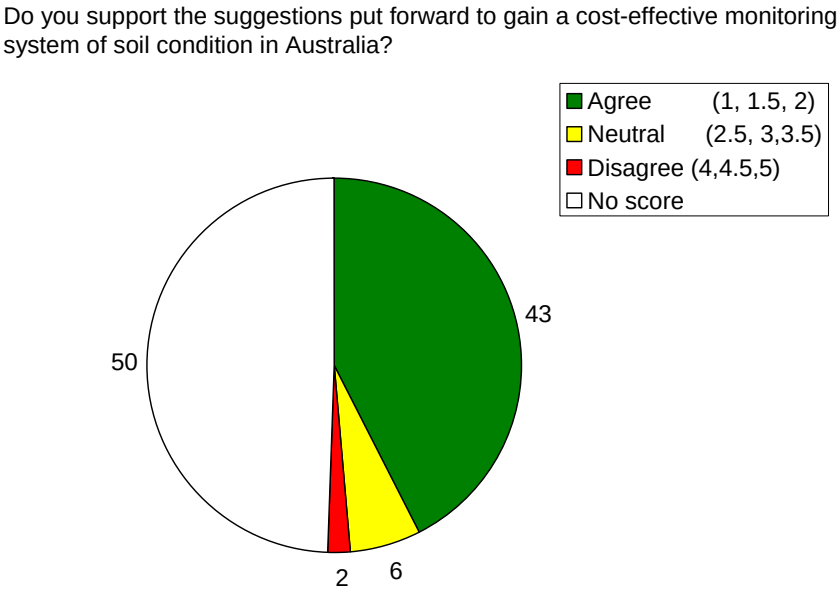


Table 6: Respondent scores relating to their support to gain a cost-effective monitoring system of soil condition in Australia.

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	51	24	0	19	0	6	0	1	0	1	50

Figure 12: Demonstration of the proportion of respondents who agreed, were neutral or disagreed with the suggestion to gain a cost-effective monitoring system of soil condition in Australia.



Qualitative responses

Agribusinesses

The four agribusinesses that responded were supportive. Among these responses, two raised education (including of landowners and agribusiness distributors) as required, one mentioned that most data on physical states is already available and that people just need to learn how to interpret it properly, and one indicated the value of using an inter-active website where contributors to soil monitoring/protection can see the results of their work.

Catchment Management Authorities

All eight respondents were supportive, with five of these noting the need to improve and share baseline data sets on soils. Three mentioned the need for regional or landholder monitoring. Three respondents also mentioned either the need for long-term monitoring or trend analysis

Committees

The respondent was supportive of a coordinated monitoring effort.

Farmer groups/industry associations

Of the seven respondents, four were obviously supportive, but one noted that whilst being supportive, they would not support targeting individual properties and increasing monitoring obligations. Other comments included that monitoring systems should encourage good practice but not penalise land managers, one respondent also criticised the utility of models.

Government agencies
Of the 16 government agencies, 14 expressed support. Among the supportive responses, one respondent expressed doubt as to the practicality of the proposed system, due to the lack of detail given in the Paper. Five agencies expressed the need for better data and data sharing, with a further respondent expressing doubt about the compatibility of state and national data monitoring. Three agencies noted the need to avoid duplication and clarify institutional roles, with another agency similarly stressing the need to coordinate efforts. The need to link soils to broader issues such as natural resource management and the environment was also noted.

Ministers
There were no comments in this category.

NGOs, Professional and Community Groups
The three respondents were supportive, one noted that there is greater coordination needed between agencies and state and regional bodies.

Overseas organisations/agencies
The respondent was neutral, noting that this would depend on the cost-effectiveness of the scheme and that faster, cheaper monitoring methods should be considered (such as Visual Soil Assessment).

RDCs, CRCs, Research and Development Corporations
The sole respondent was strongly supportive, identifying it as the highest need in this area.

University Academics/State Soil Scientists
The six responses here were supportive, two noting the need to link soils to broader environmental issues and one stressing the need for public education. One respondent highlighted that any monitoring system must be supplemented by targeted research and one respondent suggested an addition to the list - the need for training and funding to agencies that will carry out the monitoring.

Question 7 – Skills base to manage Australia's soils

Do you agree that there are adequate people on the ground with sufficient skills to interpret and apply soil information? If no, do you see this as an impediment to you as a stakeholder achieving your goals with regards to soil management?

Quantitative responses

The majority of submissions disagreed that there is adequate people on the ground with sufficient skills to interpret and apply soil information (Figure 13, Table 7, Figure 14).

Please note that it was obvious that a number of respondents scored question 7 incorrectly, for example they scored the question as 'agree' however their qualitative comments made it clear that they did not believe that there were enough skilled people on the ground. Where it was clear that an error had been made, their score for this question has been amended to reflect the position in their qualitative comments.

Figure 13: Demonstration of agreement that there are adequate people on the ground with sufficient skills to interpret and apply soil information.

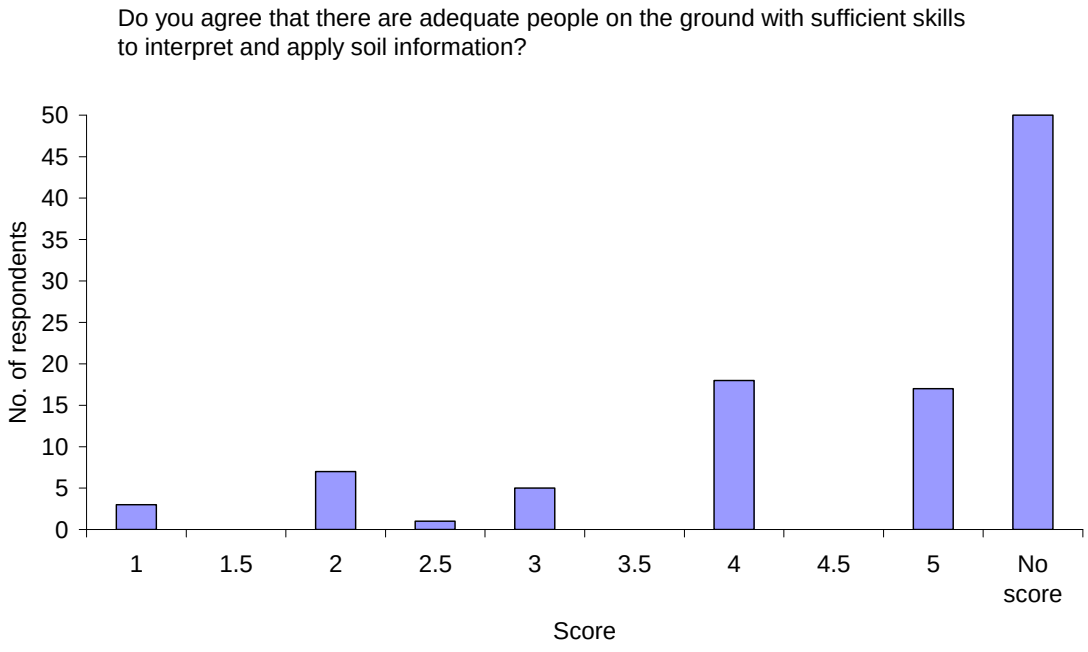
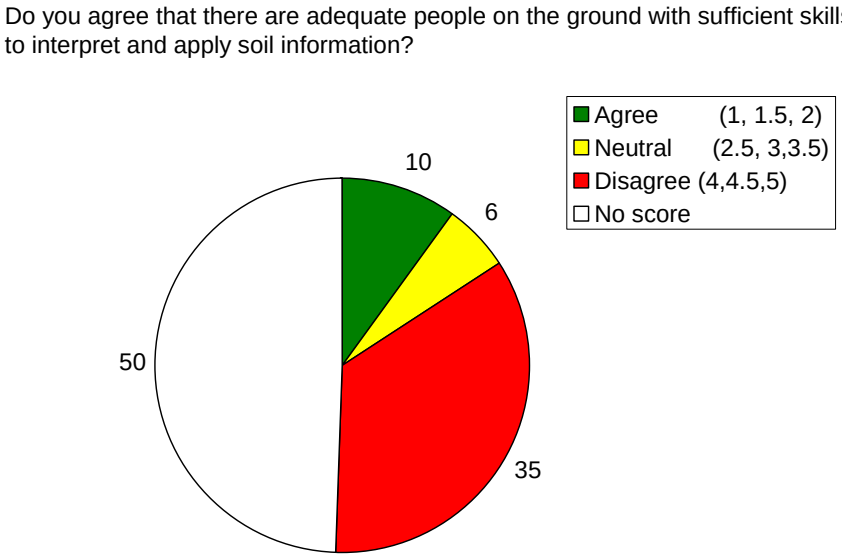


Table 7: Respondent scores relating to their agreement that there are adequate people on the ground with sufficient skills to interpret and apply soil information.

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	51	3	0	7	1	5	0	18	0	17	50

Figure 14: Demonstration of the proportion of respondents who agreed, were neutral or disagreed that there are adequate people on the ground with sufficient skills to interpret and apply soil information.



Qualitative responses

7(a) – there are adequate people on the ground with sufficient skills to interpret and apply soil information?

Agribusinesses
Of the three respondents, two agreed that there are currently enough skilled soils practitioners but that there is a need for incentives to promote change to sustainable management practices. One argued that there are too few skilled people who can translate knowledge and communicate with landholders. A respondent identified the limited scope available to take advantage of community/stakeholder skills and knowledge in soil management.

Catchment Management Authorities
Of the nine respondents, eight were in agreement that there is a lack of skilled and experienced soil practitioners. The one CMA who did believe there are adequate soils personnel on-ground, suggested that they are hampered by the quality and reliability of available soil science information and suggested that it needs to be standardised to avoid confusion. One respondent highlighted the need for more funding to support extension and capacity building options.

Committees
The sole respondent identified a combination of lack of skilled expertise, social and economic factors as all contributing to using land beyond its capabilities. Extension was highlighted as critical in a changing climate.

Farmer groups/industry associations
There were seven respondents to this question, with general agreement that there is currently a lack of skilled soils specialists in Australia. One felt that there is currently enough expertise, however, it was at risk of disappearing. One noted that re-training in systems thinking and adoption change processes would be beneficial.

It was also noted that engaging landholders in ways that provide public and private benefits could develop effective change. This was highlighted by another respondent who suggested that there is a need to develop training programs for graduates that promote whole-farm production plans and that the lack of skilled soils people results in limited information to drive policy development. Another respondent suggested that an overall ageing agricultural and soils science skills base is contributing to the limited knowledge available. One respondent stressed the need for access to independent soils and fertiliser advice.

Government agencies
The departments that provided comment on this question were all in general agreement that there is a significant problem with limited numbers of skilled and experienced soil practitioners on-ground. The limited ability to interpret complex soil information and to be able to communicate this information to landholders was seen as an impediment by seven respondents.

One agency highlighted the significant contribution of extension services provided by industry and farmer groups as it is based on measureable outcomes, is technically supported and can be used to evaluate return on investment. Individual departmental responses suggested the need for more emphasis on 'holistic' approaches to extension. The 10 departments who agreed that there are enough sufficiently skilled soils practitioners, suggested that more information is required on soil conservation approaches.

Local Government
No responses were received for this category.

Ministers
The sole respondent expressed an interest in building enhanced capacity among their staff and highlighted the difficulties faced by a small jurisdiction and overall resource constraints.

NGOs, Professional and Community Groups
Three respondents agreed that there were not enough skilled or experienced soils practitioners and that it was an impediment. Two suggested the need for positive incentives and training; with one mentioning they felt that inexperienced soils graduates rely too heavily on proven scientific approaches rather than linking soil knowledge with management practices.

Overseas organisations/agencies
The respondents noted a lack of skilled soil practitioners, with one citing an ageing and retiring soils specialist community and the other concerned at the limited specialist or site-specific soils knowledge.

RDCs, CRCs, Research and Development Corporations
The sole respondent noted more expertise was needed in soil classification and interpretation.

University Academics/State Soil Scientists
The four respondents noted a lack of soil scientists, with one suggesting that scientists in general are not valued in Australia. One suggested that this situation is also apparent in urban soil management and another respondent suggested there is an ageing skills base that is not being adequately replaced. The lack of effective extension services was also identified in one submission, suggesting that extension is essential for practice change.

7(b) – If no, do you see this as an impediment to you as a stakeholder achieving your goals with regards to soil management?

Agribusinesses
No responses were received for this category

Catchment Management Authorities
The sole respondent identified the need for a network of regionally based soil conservationists with a broad skill sets.

Committees
No responses were received for this category

Farmer groups/industry associations
The sole respondent highlighted the need for more training in the biological sciences and organic farming systems. It also suggested that farmer groups could provide effective extension information via peer review.

Government agencies
The sole respondent suggested that most soil scientists are researchers and not extension officers and that long-term funding is needed to provide growers with independent advice underpinned by good science.

Local Government
No responses were received for this category.

Ministers
No responses were received for this category

NGOs, Professional and Community Groups
No responses were received for this category

Overseas organisations/agencies
No responses were received for this category

RDCs, CRCs, Research and Development Corporations
No responses were received for this category

University Academics/State Soil Scientists

Two respondents saw the quality of soil knowledge and advice as impediments and highlighted that a sound knowledge base is needed to underpin extension services. One submission suggested that extension may not suit all stakeholders and that to engage the wider community a mass urban media campaign could assist.

Question 8 – Rebuilding capacity and training

The discussion paper proposes two options for rebuilding capacity, either by specialised soils-focused education and training, or more general training programs with soils modules as plug-ins. What do you think is the best option? Can you suggest others?

Qualitative responses

Agribusinesses
Of the five respondents, one indicated that soils-focused education and training should be the focus while two respondents felt that both options were important. One respondent commented that training is good but first the trainers need to be trained, and one called for the promotion of organic chelation.

Catchment Management Authorities
Of the ten respondents, six respondents favoured using both approaches, one favoured a generalist approach and one favoured a local solution. One respondent suggested training initiatives would not be effective on their own, and another noted the need for broader communication strategies.

Committees
The respondent suggested that an integrated approach to natural resource management was needed, which would include extension courses for farmers.

Farmer groups/industry associations
Of the nine respondents, five indicated that both options would be useful with one indicating that soils modules should link to other areas of agricultural production and NRM, one preferred a soils model, one preferred general training, while another favoured an integrated approach.

Government agencies
Of the sixteen government agencies, eight favoured using both generalist and specialist options, two favoured a generalist approach (with one noting that an integrated approach to NRM was needed) and three advocated specialist training options, or hiring soils specialists to build capacity. One commented that the best approach would depend on the particular situation.

Ministers
One State minister indicated support for both approaches indicating that education should be multifaceted but also that soils focused education and training is also needed.

NGOs, Professional and Community Groups
Of the three respondents, one supported both the specialist and generalist options while the other two commented that more holistic training is required.

Overseas organisations/agencies
The respondent suggested the generalist option.

RDCs, CRCs, Research and Development Corporations
The respondent noted they had begun to offer more specialised training.

University Academics/State Soil Scientists
One respondent advocated a soils focussed approach, two respondents advocated using both options, while one suggested using the generalist approach. One respondent indicated that face-to-face training was best while another indicated that skilled trainers are required.

Question 9 – Improving the soils literacy of regional NRM

The paper identifies immediate opportunities to improve the soils literacy of the regional NRM investment model. Do you agree with the list of opportunities that should be developed and promoted? Are there any changes you would make to this list? If you are involved in the regional NRM investment model please confirm this, and indicate if you are willing to support these opportunities and if not, why not?

Quantitative responses

The majority of responses agreed to the improvement of the soils literacy of regional NRM investment model (Figure 15, Table 8, Figure 16).

Figure 15: Demonstration of support for the list of opportunities that should be developed and promoted to improve the soils literacy of the regional NRM investment model.

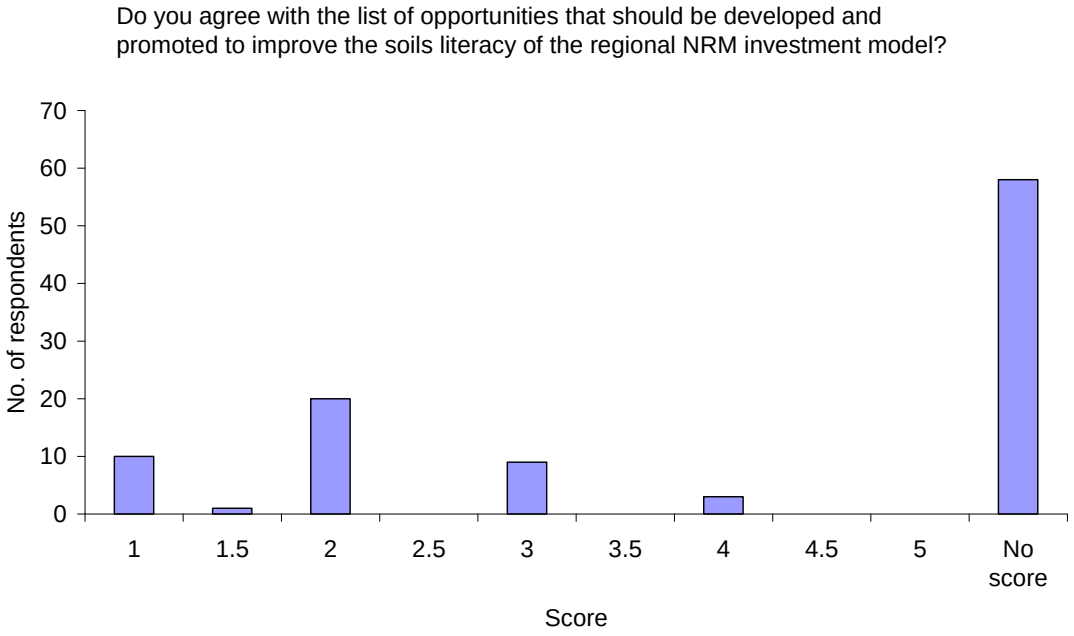
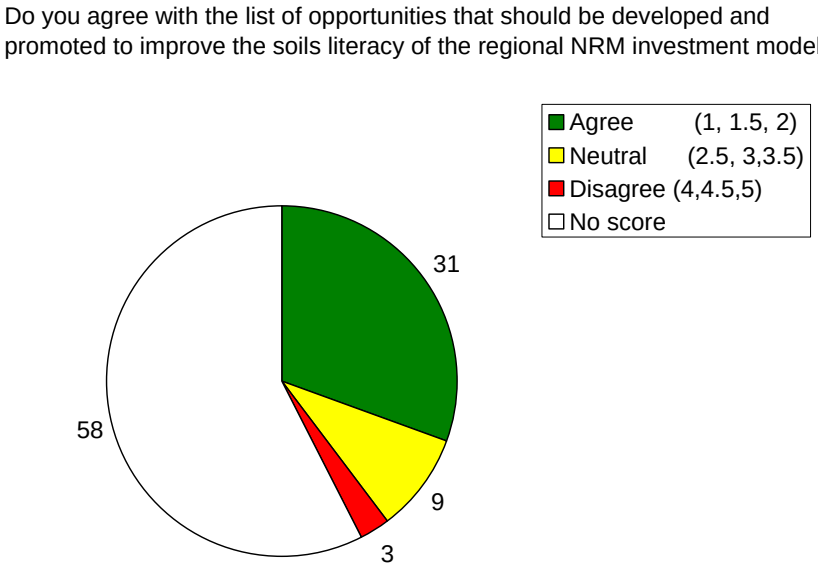


Table 8: Respondent scores relating to their support for the list of opportunities that should be developed and promoted to improve the soils literacy of the regional NRM investment model.

Score	Total scores	1	1.5	2	2.5	3	3.5	4	4.5	5	No score
		Strongly agree				Neutral				Strongly disagree	
No. of responses	43	10	1	20	0	9	0	3	0	0	58

Figure 16: Demonstration of the proportion of respondents who agreed, were neutral or disagreed with the list of opportunities that should be developed and promoted to improve the soils literacy of the regional NRM investment model.



Qualitative responses

Agribusinesses

Of the five agribusiness respondents, one mentioned that regional bodies needed greater funding and support. Two respondents noted the need to focus on on-ground or local outcomes.

Catchment Management Authorities

Of the eight respondents, seven were supportive, and one indicated the question was not applicable. Three respondents indicated that these issues were already covered through their regional planning process, while three other respondents suggested options for increasing awareness, including through extension and promotion to landholders.

Committees

The one respondent was supportive, and noted that this aligned with ‘Caring for our Country’ initiative.

Farmer groups/industry associations

Of the six respondents, one suggested collaboration between agencies to improve soils literacy, while another suggested focusing more on biological approaches. One respondent mentioned that Caring for our Country did not fit as well with the regional model. Two respondents commented on the need for experienced people and that a National strategy could help identify where those skilled people are required.

Government agencies

Of the 11 government agencies, seven indicated general agreement. One agency noted that many of the issues raised had already been addressed by their agency. Two

agencies noted that decision support tools were only helpful if local priorities had already been identified, with two other agencies also placing emphasis on local outcomes or on integration with regional NRM planning. Two agencies raised concerns about Caring for our Country being less supportive than previous funding arrangements.

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The sole respondent mentioned that Caring for our Country did not fit as well with the regional model.

Overseas organisations/agencies
The respondent was supportive.

RDCs, CRCs, Research and Development Corporations
The respondent was supportive, particularly of training, extension and communication.

University Academics/State Soil Scientists
Two respondents were neutral, one supported an integrated approach, and one agreed that condition targets and decision tools could increase soil literacy. One respondent commented that soils were not mentioned much in the 'Caring for Our Country' guidelines.

Question 10 – Ways forward

What options do you see as the best 'way forward' and why?

Qualitative responses

Agribusinesses
Of the four respondents, there was general agreement that increased funding is required to deal with soil management issues, including one respondent who specified urgent funding is needed for sustainable soil management approaches and more extension officers on-ground.

One submission noted that stakeholder's options must be understood to progress ways forward, while another suggested that agri-distributors need to be trained in soil health approaches. One respondent supported the 'ways forward' listed in Part 5 of the Paper. Another respondent supported the development of a national policy to set the foundation for flexible and innovative delivery.

Catchment Management Authorities
Ten respondents mentioned the need to increase education and knowledge to improve soils literacy, with most stressing the need for communication and training and three mentioning the need for a national database.

Individual responses also highlighted one of the following factors - that a lead agency is required, the listed options in the Paper would need to be prioritised prior to any planning, the need for an integrated approach which linked soils to wider NRM issues and the need to support farmers or agricultural groups. Also, additional funding for regional bodies, low cost options for landholders and strengthened links between soil management and environmental issues across the political, industry and policy spectrum.

Committees
The respondent noted new investment opportunities under climate change and sustainable farming.

Farmer groups/industry associations
The seven respondents offered a variety of suggestions, including training, research, development, and public awareness.

One respondent suggested that solutions should be based on farmer involvement and needs to be systems-based and another respondent suggested that the regional model is limited in addressing 'big issues' such as mining and waste disposal. Also identified by individual submissions was the need for identified cooperation from all stakeholders with a single vision for soil management as critical in assisting in progressing soils knowledge and that innovative farmers need ongoing education.

Government agencies
There were 16 respondents in this category. Seven agencies suggested there was a need to increase knowledge and research in this area (strategies suggested included

better compiling and sharing of data). Three agencies suggested there was a need to raise community awareness of soils and three agencies stressed the need for more education and extension activities. Five agencies suggested linking soils to broader issues such as climate change, food security or natural resource management; three agencies suggested a national strategy or framework would be beneficial; three agencies noted the need for higher levels of investment and two agencies suggested more soils monitoring was needed.

Local Government
There were no responses in this category.

Ministers
The sole respondent highlighted the need for a desktop analysis of the cost of soil degradation to demonstrate the links between carbon storage, greenhouse gas emissions, and water quality and quantity. It also suggested that more skilled people who are able to interpret and apply information are needed. This could happen via education and extension programs to rebuild explicit soils-focused undergraduate and /or post-graduate research and coursework degrees.

NGOs, Professional and Community Groups
The three respondents were in general agreement with the proposed options in the Paper with one suggesting that there should be less focus on past under-investment in soils and more focus on the production benefits of healthy soils as an argument for re-investment. One response noted the need for more training courses in soil management within a whole-farm-planning context and more R&D on soil health and the links to water use efficiency.

One respondent also suggested that the Paper relies too much on the regional model and that it did not appear to align with 'Caring for Our Country' priorities while another noted the need for demonstrations of biological farming approaches across different agro-ecological zones to reduce the reliance on chemicals and fertiliser use.

Overseas organisations/agencies
There were no responses in this category

RDCs, CRCs, Research and Development Corporations
The respondent suggested several options, including adding soils to the Primary Industries Standing Committee (PISC) agenda, increasing research and raising industry engagement.

University Academics/State Soil Scientists
The six respondents suggested integrating soils with wider NRM, including the importance of integrating agriculture with the environment to improve on-farm resilience and sustainability.

One respondent promoted alternative farming methods, another suggested a major focus on soil health and one highlighted the importance of rebuilding commitment and raising community awareness through public media campaigns.

Question 11 - Open comment

Open comment – we welcome any comments on the paper including, but not limited to:

a. *Requested amendments / additions*
b. *Is there is an appropriate level of awareness and understanding by the community of threats to the soil and the potential consequences?*
c. *Is there an understanding of soil condition in your area/ industry and the potential capabilities of those soils?*
d. *What are the extension / education projects we need to have to enable sustainable management of soils?*
e. *What information do you need to have to meet your business goals?*

This question provided respondents with the opportunity to expand on the guiding questions and suggest more specific soil management requirements in Australia.

Qualitative responses

11a. *Requested amendments / additions*

Agribusinesses
There were two agribusiness responses, one of which suggested a large number of possible additions and one which objected to the description of a leading soils science organisation as 'moribund' (p.15); a technical error was noted on page 8.

Catchment Management Authorities
Of the two respondents, one cited lack of knowledge by landholders as a problem, the other noted that duty of care (p. 9-11) would be hard to enforce.

Committees
There were no respondents in this category.

Farmer groups/industry associations
There was one respondent in this category who requested a National standard for soil testing.

Government agencies
Nine agencies responded with no commonality between responses. More accuracy was requested on the history of soil research and management, including the role of Australia's leading soil science organisations. Technical errors were noted on pages 15 and 19.

Other individual suggestions were to include or expand on sections on urban planning, the potential benefits of applying organic residues, engaging industry and the wider community, soil ecology, intergenerational equity, disconnect between soil and health, public v private, role of government and decision making criteria. An example was provided of the reef plan and the need to expand research and development was referred to. One agency suggested drawing upon the recommendations of a recent soil health extension project.

Ministers
One State Minister requested the amendment of Appendix A and indicated an incorrect reference on page 41.

NGOs, Professional and Community Groups
The one respondent in this category objected to the reference to a leading soil science organisation as 'moribund' (p.15); technical error noted on p.32.

Overseas organisations/agencies
No comment

RDCs, CRCs, Research and Development Corporations
The respondent detailed their previous investments in soils and noted that the paper over-emphasised the role for sequestered carbon, and that publications from the National Land and Water Resources Audit remained the best source of soils information.

University Academics/State Soil Scientists
Both respondents objected to the description of a leading soil science agency as 'moribund' (p.15). The photograph (p.32) is misleading; the soil condition depicted is not caused by carbon alone.

Qualitative responses

11.b *Is there is an appropriate level of awareness and understanding by the community of threats to the soil and the potential consequences?*

Agribusinesses
The respondent suggested a need to improve landholder understanding.

Catchment Management Authorities
All three respondents felt understanding was insufficient, with one noting that visible threats were best understood.

Committees
There were no responses in this category.

Farmer groups/industry associations
Of the three respondents, one indicated that the urban community's understanding should be raised and the other two respondents commented that there is poor or patchy awareness and understanding by the community.

Government agencies
Four respondents indicated it was inadequate with the fifth noting understanding was variable.

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The sole respondent suggested a need to improve landholder understanding, and noted a need for improved community understanding.

Overseas organisations/agencies
There were no responses in this category.

RDCs, CRCs, Research and Development Corporations
The sole respondent here referred to an attachment on their organisation's work in this area.

University Academics/State Soil Scientists
The sole respondent indicated that understanding among the urban community was poor.

Qualitative responses

11c. *Is there an understanding of soil condition in your area/ industry and the potential capabilities of those soils?*

Agribusinesses
The two respondents said understanding was inadequate.

Catchment Management Authorities
Three respondents indicated understanding was inadequate; the fourth felt the real lack was an Australian benchmark process.

Committees
There were no respondents in this category.

Farmer groups/industry associations
Both respondents said that there is some understanding of soil condition in their area with one noting that landholder understanding was very localised and the other commenting that there is the potential for great improvement.

Government agencies
The five agencies who responded felt that understanding was variable.

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The two respondents said that understanding was inadequate, with one promoting biological farming as a solution.

Overseas organisations/agencies
There were no respondents in this category.

RDCs, CRCs, Research and Development Corporations
The sole respondent referred to their organisation's work in this area.

University Academics/State Soil Scientists
The sole respondent indicated good understanding was unusual.

Qualitative responses

11d. *What are the extension / education projects we need to have to enable sustainable management of soils?*

Agribusinesses
The two respondents suggested focusing on landholder education, with one promoting organic supplements.

Catchment Management Authorities
Two of the three respondents suggested more emphasis on soil management, while the third noted the need for Australian benchmarks.

Committees
There were no responses in this category.

Farmer groups/industry associations
Two respondents stressed the need for biological and organic farming processes and management. One commented that there is a need to make soil health interesting and basic.

Government agencies
The five agencies gave individualised responses, recommending respectively 'Healthy Soils for Sustainable Farms' program, 'Save our Soils', farm demonstrations, regulation and an approach that integrated soils with wider NRM issues.

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The sole respondent indicated the need for long-term trials and demonstration activities and the need to work with innovative farmers and farmer groups.

Overseas organisations/agencies
There were no responses in this category.

RDCs, CRCs, Research and Development Corporations
The sole respondent referred to extension work undertaken by an RDC.

University Academics/State Soil Scientists
The two respondents here respectively suggested emphasising resilient landscapes under climate change and the need for university soils subjects.

Qualitative responses
11e. *What information do you need to have to meet your business goals?*

Agribusinesses
The respondent indicated the need for a simple scientific outline of detrimental effects.

Catchment Management Authorities
The three responses here were individualised and included the need for resources, policy, better data and a framework, which integrated soils with wider issues.

Committees
There were no responses in this category.

Farmer groups/industry associations
One respondent made a number of suggestions, including the need for a draft strategic plan. The other respondent indicated a need for information from independent (unbiased) sources.

Government agencies
The four responses were individualised and included monitoring soil carbon, increasing landholder knowledge and improving the knowledge base.

Ministers
There were no responses in this category.

NGOs, Professional and Community Groups
The sole respondent indicated soils information.

Overseas organisations/agencies
There were no responses in this category.

RDCs, CRCs, Research and Development Corporations
Respondent referred to an attachment detailing one organisation's work in this area, and noted that information compiled by the Audit was one of the most significant resources in this area (showing a need for further investment in synthesising soils information).

University Academics/State Soil Scientists
There were no responses in this category.

Unstructured comments

This section is a summary of comments that were received from respondents who did not utilise the guiding questions to formulate feedback on the Paper.

Qualitative responses

Agribusinesses
Of the six respondents in this category, four were advocating organic or biological approaches and products. These included biological farming, organic products, vegetation management to improve nutrient recycling, biochar and biomineral supplements for soil amelioration.

Catchment Management Authorities
There were seven respondents in this category; two of these noted that long-term funding was needed for long-term programs (i.e. 'soils are slow to change'). Two commented on landowner engagement, one noting the need for social research on drivers of practice change, the other noting farmers' capacity to adapt. One commented on matching soils to suitable land uses and another raised concerns that 'Caring for our Country' did not fit well with regional development as well as concerns about losing agricultural land to development.

Committees
There was one respondent in this category who expressed the need for stronger links between the National Coordinating Committees, including the NCST and the National Committee on Land Use and Management.

Farmer groups/industry associations
The seven respondents provided individualised responses, one noting a loss of expertise following the disbanding of the state Soil Conservation Services, two promoting organic farming and another voicing opposition to further regulation or legislation. One respondent advocated controlled traffic farming while another commented that emphasis on soil carbon is not realistic.

Government agencies
There were 16 respondents in this category. Five agencies noted the need for integrating soils with wider natural resource management issues, with two specifically mentioning biodiversity. Two agencies mentioned soil monitoring; three agencies mentioned the need for mapping and land use information; two mentioned state soils policies; four agencies mentioned the need for a database or for expansion of ASRIS; two mentioned the need for soil measurements and two noted the lack of soil scientists; one agency requesting more regional investment.

Ministers
The sole respondent in this category praised the report and drew attention to the role of the CSIRO and the ASRIS.

NGOs, Professional and Community Groups
There were six respondents in this group. Three commented on the need to shift to adopt organic and biological approaches, one of these was extremely critical of both

the paper and the NCST. One commented that without a soils focus Australia will struggle to meet its greenhouse gas targets. One emphasised the potential for soil carbon trading and bio-sequestration, while another commented on the link between agricultural practices and human health problems.

Overseas organisations/agencies
One respondent stressed that soils were vital, and proposed joint Australian – European Union activities. The other respondent complained that there was too much promotion of organic approaches.

RDCs, CRCs, Research and Development Corporations
The only substantive response in this category suggested the need for more research and a national framework.

University Academics/State Soil Scientists
There were six respondents in this category, two of whom offered congratulations on the report while a third was very critical of its technical content. The other responses were individualised and included the need for more extension and the potential to use native vegetation shelterbelts to increase soil function, and the need for on-ground outcomes and landholder engagement.