

Drought Resilience Funding Plan Consultation Draft

*A Submission to the Future Drought Fund Consultative Committee
by the
Cooperative Research Centre for High Performance Soils (the Soil CRC)*

About us

The Cooperative Research Centre for High Performance Soils (the Soil CRC) was established in 2017 with support from the Australian Government and 40 participants from across Australia. With funding of \$39.5 million over 10 years from the Government and \$127 million in cash and in-kind from its participants, it is the largest collaborative soil research effort in Australia's history.

The Soil CRC brings together eight universities, four state agencies, 20 farmer groups and a range of industry partners working collaboratively to solve industry problems. The Soil CRC complements the existing soil research investment and activity by RDCs, CSIRO, other universities and other research providers and seeks to work collaboratively under the National Soil Research, Development and Extension Strategy.

The 40 participants of the Soil CRC range from small farmer groups to large government agencies and universities. The diversity of farming systems along with the geographical coverage of farmer groups means the Soil CRC is well represented across Australia.

The purpose of the Soil CRC is to develop and provide farmers with the knowledge, information and tools to make smart soil management decisions and act on complex soil management issues. It bridges the gap between soil science and farm management, bringing together researchers, industry and farmers to find practical solutions for improving the performance and productivity of Australia's soil. This enables farmers to optimise their business productivity and profitability, and ensure the long-term sustainability of their farming businesses.

About this submission

This submission highlights the importance of soil management in contributing to drought resilience, the importance of research, development and extension to enable farmers to improve their drought resilience through improved soil management and the role and potential role of the Soil CRC in contributing to this research, development and extension effort.

In making this submission, we recognise that there are many important proposed and potential actions that will help build drought resilience in Australia's agricultural sector and rural communities. However, in recognition of our mandate and our area of expertise, we have limited our comments to those that are related to soil.

Soil management

Australian agriculture has a long and well documented history of being impacted by drought. And the most striking images associated with drought tend to show landscapes where the soils are bereft of any vegetative cover, dry, cracked and eroding. Lifeless.

Yet, the way in which farms have been impacted by droughts has changed from decades past where large amounts of topsoil were regularly blown away and crops and pastures were total failures and write-offs. In recent droughts, including the drought currently impacting much of eastern Australia, there are regular reports of profitable crops being harvested following decile 1 growing season rainfall and ground cover being maintained and holding back soil during wind events. While there are still crop failures and dust storms, the frequency and extent is generally not as great as observed in earlier decades.

This is partly due to changed farming practices such as stubble retention and minimum or no-tillage and the prioritisation given to maintaining ground cover for as long as possible. In turn, this has highlighted the importance of good soil management in reducing the impacts of drought in building soil organic matter levels, improving soil structure, infiltration and water holding capacity, and reducing susceptibility to erosion.

Soil that has been well managed and has built high levels of fertility, organic matter and structure will resist the impact of reduced rainfall for longer when droughts commence, be more resilient in times of drought and recover quicker when it does rain again. However, the time to invest in improved soil management is when drought conditions are absent. It is difficult to apply many of the known beneficial soil management practices when soils are water-limited, and the financial capacity of the farmer is cash-limited.

Soil research, development and extension

To provide farmers with the information, knowledge and tools to further improve their soil management, and in turn increase their resilience to drought, additional investment and activity in research, development and extension is necessary.

Research is needed to provide farmers with innovative soil management solutions that lead to increased productivity, increased carbon sequestration, decreased off-site environmental impacts and increased resilience in times of drought.

Having the research solutions is one thing. It is just as important that the soil management solutions are adopted and put into practice by farmers. Hence, there needs to be an equally strong commitment to working with farmers to ensure that the research and technical knowledge is widely disseminated and communicated.

Farmer, landcare and natural resource management groups play an important role in this area in Australia. Operating on a not-for-profit basis, their continued support by government is integral to effective extension efforts to support farmers in their soil management activities.

The potential role of the Soil CRC

The Soil CRC has an active research agenda focussed on the following four outcome areas:

1. New mechanisms for financially rewarding improved soil management
2. New ways to measure the performance of soils
3. New advanced and innovative products to increase soil fertility and function
4. New integrated soil management solutions that provide greater precision for farmers

Each of these outcome areas is supported by an active program of projects, often with researchers, industry and farmer groups working together to identify the priorities, develop the proposals, implement the projects, analyse the results and communicate the findings.

The Soil CRC is also very active in adoption efforts, working through its state government agency and farmer group members to communicate directly to advisors and farmers.

It is also active in building technical capacity to support further improvements in soil management. This includes 46 PhD students being trained with an understanding of Australian agriculture and its industry needs.

The Soil CRC has recently released its Strategic Plan 2019-2023. This plan recognises that Australian agriculture faces challenges from the likely increasing frequency and intensity of droughts under climate change. Through its research and innovation program, the Soil CRC will develop new approaches to soil management to unlock the potential of Australia's agricultural sector, while also helping farmers adapt to a changing climate.

An example of this research is a project that is currently underway to better understand how soil systems function, change and adapt to drought stresses, to identify the main indicators of soil functional resilience against drought stresses, and to understand how to improve soil functional resilience to drought stresses for a range of soil types and farming systems.

Regenerative agriculture is frequently proposed as a way of building resilience to drought. A growing number of innovative farmers are attempting to restore or improve the performance of Australian soils using regenerative practices that are designed to build soil carbon and soil resilience. The Soil CRC is undertaking a project with researchers, farmers and extension practitioners working together to quantify the effectiveness of regenerative farming systems for improving soil performance and drought resilience

In response to the current drought, the Soil CRC is undertaking a short-term project that aims to collect the known, scientifically-based information about how soils react to extended periods of water deficit, how they respond when it does rain again, and most importantly, what management actions farmers can take to optimise the performance of their soils when the water stress of a drought is removed.

With additional investment, the Soil CRC would be able to fast track some of its more promising research, allocate additional resources to areas of high demand and interest, focus more on how to manage soils going into, during and coming out of a drought, and deliver more training and extension activities to meet the demands and interest of advisors, farmer groups and farmers.

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