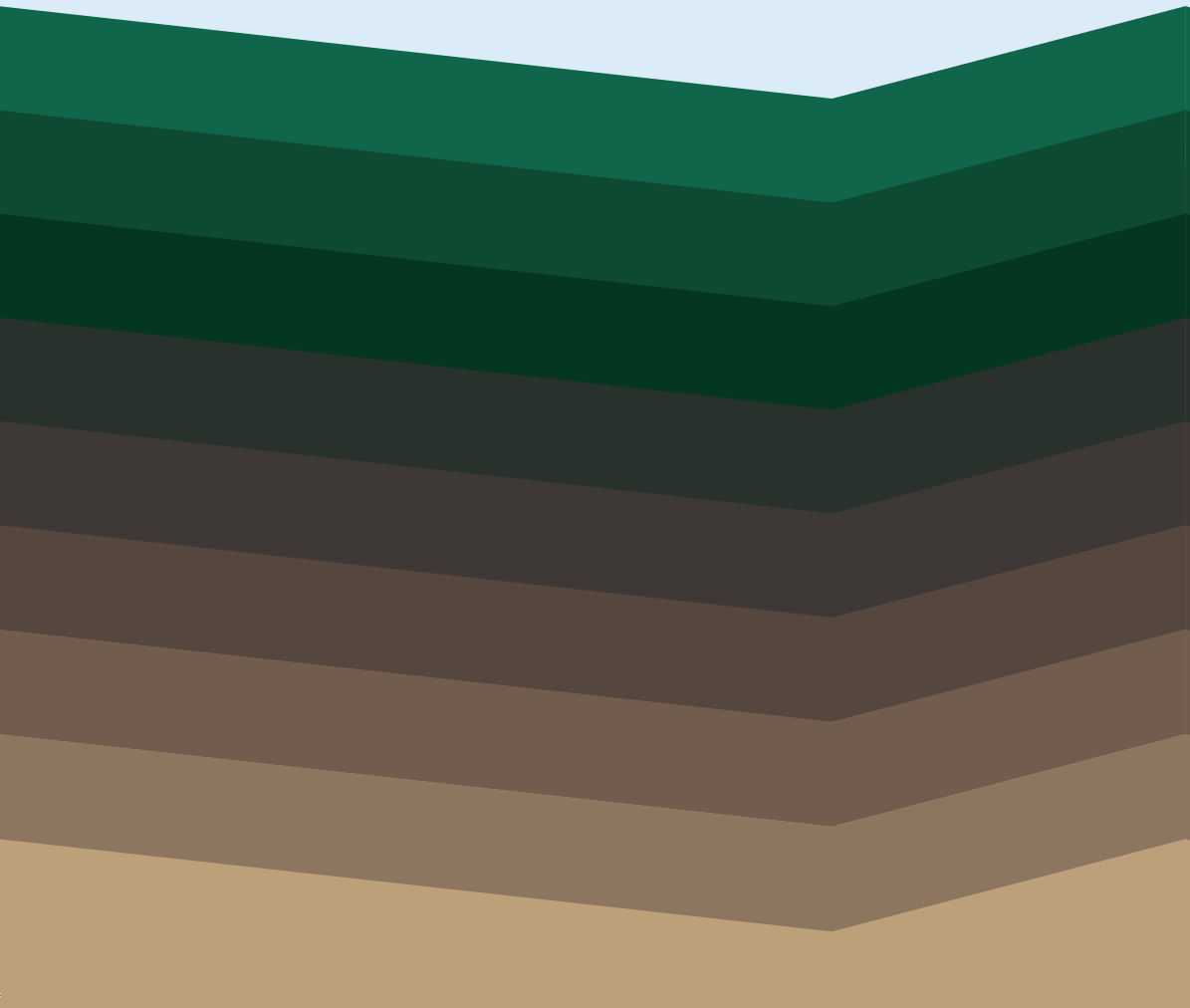
Australian Government

Office of the National Soils Advocate

National Soils Advocate Forum 2022

Economic Consideration and Market-Based Drivers of Soil Health Change

Thursday 5 May 2022
Old Parliament House, Canberra



Program

Economic considerations and market-based drivers of soil health change

OPENING SESSION	
9.45am	**Welcome and introduction** Master of Ceremonies: Ms Sue Bestow Senior Adviser Office of the National Soils Advocate
9.50am	**Opening address** The Hon Penny Wensley, AC National Soils Advocate
SESSION 1 – INTRODUCTION TO THE COMPLEXITY	
10.00am	**More than just carbon: What is soil health and why should we care?** Associate Professor Vanessa Wong President of Soil Science Australia School of Earth, Atmosphere and Environment Monash University
10.30am	**Soil Organic Carbon – why is it so complex?** Adjunct Associate Professor Beverley Henry Faculty of Science, School of Biology & Environmental Science Queensland University of Technology
11.00am	Morning Tea

SESSION 2 – MARKET BASED INSTRUMENTS TO DRIVE CHANGE	
11.30am	**Schemes, costs and benefits of soil carbon sequestration on farms** Mr Philip Mulvey Chief Executive Officer Carbon Count
12.00pm	**Natural Capital Accounting and Environmental Stewardship payments as drivers of soil management change** Dr Stuart Whitten Senior Principal Research Economist CSIRO Land and Water
12.30pm	**Finance issues – Green debt and equity investment opportunities** Dr Nicholas Pawsey Senior Lecturer in Accounting Charles Sturt University / Soil CRC
1.00pm	**Activating consumer and other markets to better reward soil stewardship practices** Prof Mark Morrison Faculty of Business, Justice and Behavioural Sciences Charles Sturt University / Soil CRC
1.30pm	Lunch
SESSION 3 – PRACTICALITIES AND ADOPTION	
2.15pm	**Soil health improvement in practice-opportunities and challenges for Australian farm businesses**. Dr Kate Burke Managing Director Think Agri
2.45pm	**Farmer behaviour change and adoption of new practices** Prof David Pannell Professor of Agricultural and Resource Economics University of Western Australia
3.15pm	**Sustainable cotton production - an example of what drives change** Dr Oliver Knox Associate Professor of Soil Systems Biology University of New England
3.45pm	**Panel discussion** Facilitator: The Hon Penny Wensley, AC National Soils Advocate
4.30pm	**Event Close**

Australia's National Soils Advocate

The Hon. Penelope Wensley AC

The Hon. Penny Wensley AC was appointed National Soils Advocate in August, 2020, succeeding Australia's first soils Advocate, Major General the Hon. Michael Jeffery AC, CVO.

Former Governor of Queensland and distinguished Australian diplomat, Ms Wensley's interest in soils, soil health and sustainability dates from the early 1990's, when she was Australia's Ambassador for the Environment. In this role, she championed Australia's interests at the landmark 1992 UN Conference on Environment and Development (UNCED) and was a key contributor to the negotiation of the three major environmental treaties launched by the UNCED process: the UN Framework Convention on Climate Change, the Biodiversity Convention and the Convention to Combat Drought and Desertification. This experience — and serving as Chairman of the first UN Conference on the Sustainable Development of Small Island Developing States — established a deep conviction of the importance of managing our natural resources in a sustainable way.

As State Governor, Ms Wensley was active in promoting environmental knowledge and awareness and was a strong supporter of community groups and organisations involved with environmental management, conservation and protection, including as State Patron of Queensland Water and Land Carers.

During her six-year tenure as Governor, seeing first-hand the impact of the succession of droughts, floods and cyclones experienced by the State, including the biggest storm ever to hit Queensland, Cyclone Yasi in 2011, strengthened her commitment to advocating for sustainability and better management of Australia's natural assets.

Ms Wensley has held many leadership roles, nationally and internationally. In addition to her knowledge of the environment and environmental policy, she brings to the position of National Soils Advocate, substantial expertise in public policy development, strategy development and implementation, communication and negotiation, and community and stakeholder engagement.

Ms Wensley is a Fellow of the Australian Institute of International Affairs and an Honorary Fellow of the Environment Institute of Australia and New Zealand. In addition to her role as National Soils Advocate, she is a Director of the Lowy Institute, Chairman of the Great Barrier Reef Advisory Committee, Patron of Soil Science Australia and of the Soil CRC.

Speakers: Session 1

Associate Professor Vanessa Wong
President, Soil Science Australia
School of Earth, Atmosphere and Environment, Monash University

Associate Professor Vanessa Wong is based in the School of Earth, Atmosphere and Environment at Monash University and accredited as a Certified Professional Soil Scientist (CPSS).

Her research focuses on biogeochemical processes and their interactions in soils, sediments and water in agricultural and natural environments. She is an interdisciplinary soil scientist and collaborates on projects across disciplines including in Indigenous archaeology, earth sciences, engineering, and the social sciences. She has published over 90 articles and reports, including >50 peer reviewed journal articles and >30 technical reports which have underpinned land and water management plans.

She is the current President of Soil Science Australia, Vice Chair of the Acid Sulfate Soil Working Group in the International Union of Soil Sciences, Editor in Chief of Land Degradation and Development and facilitator in Homeward Bound, a global leadership program for Women in STEM.

Abstract: More than just carbon: What is soil health and why should we care?

Soils are the drive train of terrestrial ecosystems. Organic materials all pass through soils which are converted into organic matter and nutrients to be taken up by microbes and plants. There has been considerable focus on increasing productivity to build up soil organic matter and improve soil health in recent years. However, soil health is much more than just the carbon we measure in soil organic matter.

The world belowground is a complex ecosystem which sustains aboveground productivity and maintains environmental quality. These belowground processes depend on the interactions between the physical soil environment, the chemical properties which can reflect soil fertility, and the biological activities of the microbial community. Ensuring that these belowground processes are maintained is critical for the health of soil ecosystems and the aboveground environments that they support.

Adjunct Associate Professor Beverley Henry

Faculty of Science, School of Biology & Environmental Science, QUT

Beverley Henry has been involved in research, policy and industry roles across agriculture and land use sectors for 30 years. Her work has largely been in the areas of climate change, climate variability and environmental management, including in greenhouse gas and carbon credit accounting and monitoring. She holds an adjunct position at Queensland University of Technology, undertakes consulting in agriculture and climate, and is a member of several domestic and international panels and committees including the present co-chair of the Scientific and Technical Committee of the '4 per 1000 Initiative for Food Security and Climate'.

Abstract: Soil Organic Carbon – why is it so complex?

Around 58% of the organic matter in soils – plant litter, roots, soil fauna and microorganisms – is carbon, and farmers and agronomists have long been aware of its value. Soils high in organic carbon are commonly healthier and able to more efficiently cycle water and nutrients to support strong plant growth and hence agricultural productivity. Recent decades have seen an intensification of interest in managing the carbon content of soil to help combat increasing threats to food security on local to global scales that result from population growth, strains on resources and increasingly hostile climatic conditions. So too has interest intensified in the role of soil carbon in the global carbon cycle, in recognition of the urgent need to address global warming and avert the worst threats of climate change as identified in the Paris Agreement and recent IPCC Assessment reports.

Organic carbon in soils represents an equivalent amount of carbon removed as carbon dioxide from the atmosphere through plant photosynthesis. The concept for climate change mitigation appears simple – more photosynthetic removal of carbon dioxide gives more plant growth and, in turn, more organic matter that, if stored in soil, gives a net reduction in greenhouse gases and less global warming. The processes and dynamics are far more complex. Soil carbon is not homogenous and different forms turn over at different rates, with 80-90% being returned to the atmosphere as carbon dioxide in days to months. This decomposition releases nutrients and energy needed for soil health and plant growth, but it leaves only a small fraction available to be stored for multi-decadal or longer time periods (called sequestration). This presentation discusses current understanding of the natural factors and management activities that influence sequestration in Australian agricultural soils, how soil carbon is measured, and some considerations for farmers interested in carbon offsets.

Speakers: Session 2

Mr Philip Mulvey
CEO, Carbon Count

Philip Mulvey is part consultant, part contractor, part researcher and part entrepreneur, and has always been a free thinker.

He has built army bases in East Timor, supervised the erection of the largest tent in the UK, sold Aussie meat pies in the USA, cleaned up two uranium mines, developed townhouses on landfills, rewritten the manual on oil palm development in PASS in Sumatra, evaluated rehabilitation of the desert in Kuwait, participated in the first green city design in the world, evaluated degraded land in Monaro and has represented Australia in sailing.

Phil is a specialist in soil and water chemistry, with over 25 years' experience in soil sciences, hydrogeology, water resource assessment, contamination studies, geological mapping and aquifer modeling.

He currently has businesses in environmental soil science, whole-of-farm management, bioremediation, civil earthworks and property development. Through these avenues he has trained numerous scientists in the art of commercial scientific problem-solving.

Phil's critically acclaimed book Ground Breaking is a culmination of his lifelong pursuit to provide practical solutions for agricultural management, enabling the restoration of landscape, climate and community.

Phil focuses on practical real world solutions to some of the largest problems facing humanity today, including land use management, soil carbon sequestration, bare ground reduction and bush corridor restoration.

Abstract: Schemes, costs and benefits of soil carbon sequestration on farms

For all carbon offsets to qualify as carbon credits, international standards with Paris 2015 and CoP26 Article 6 must be met. Primarily, the scheme needs to address these key points: additionality (or newness), permanence and avoiding leakage. The framework needs to be embedded into any carbon scheme that is developed both locally and internationally. One of the few international schemes and by far the oldest and longest is offered by the Australian federal government through the Clean Energy Regulator (CER). A farmer can choose to trade carbon through the government regulated scheme; either with the government or companies that exceed their regulated emissions, or the Australian voluntary market that uses the ERF system; or by using an overseas standard of variable integrity. The Australian regulated market is deemed to be more credible as global schemes including VERRA and Gold Standard do not have the measurement and integrity of the Australian scheme and are not yet to fully operational.

The Soil Carbon Methodology, one of many regulated by the ERF, contains 13 pre-approved farm system changes that have been scientifically demonstrated to sequester carbon in that humification dominates over mineralisation of vegetative litter. But to run a successful soil carbon project, often these farm system changes have to work together in a coherent system, otherwise the chances of actually sequestering carbon is low.

The on and off-farm benefits and rewards as well as costs associated with carbon and agricultural produce are also presented. There are also some funding opportunities available from both state and federal governments to run a farm soil carbon project. Farmers have the choice of offsetting or for the larger players used as insets.

Speakers: Session 2

Dr Stuart Whitten
Senior Principal Research Economist, CSIRO Land and Water

Dr Whitten is currently CSIRO Land and Water Sustainability Pathways Program Research Director (Acting) and senior environmental and institutional economist. He has held a range of leadership roles in CSIRO Land and Water across economics, social sciences and modelling capability. He has worked on the design, delivery, and evaluation of a wide range of environmental policy instruments including the Australian Government's Environmental Stewardship Program and Reef Trust Tender, offset programs in Queensland and NSW, and with NRM groups on reverse auctions. Currently his focus is on assembling multi-disciplinary capability across CSIRO and industry to solve challenging problems related to a natural capital management.

Abstract: Natural Capital Accounting and Environmental Stewardship payments as drivers of soil management change

Australian agriculture contributes some $63billion to the Australian economy – all underpinned by our soils as the basis of production. Yet surprisingly we do not directly measure soil health as part of business assets and balance sheets. To do this we need accurate yet cost-effective measures, preferably also simple to communicate and widely generalisable, that can translate the often complex world of soils into a language that farmers, finance, markets and consumers can understand. Measurement challenges in Australia may be more challenging because of the variability in our climate and shifts in soil health balances across crop rotations and in response to other inputs. Overcoming these challenges in a natural capital accounting framework can provide effective incentives to proactively manage risks through day-to-day management decisions combined with appropriate physical measures demonstrating success.

Dr Nicholas Pawsey

Senior Lecturer in Accounting, Charles Sturt University / Soil CRC

Dr Nicholas Pawsey is a senior lecturer from the School of Business, Charles Sturt University. Dr Pawsey's expertise relate to accounting for environmental assets with a focus on soil and water. He has published a number of commissioned reports, journal articles and book chapters on these topics.

Dr Pawsey's most recent projects have considered opportunities to activate banking and investment markets to reward soil stewardship. These projects have required extensive consultation with financial market participants and grower groups and have been supported by the Cooperative Research Centre for High Performance Soils (Soil CRC) and Australian Accounting Standards Board (AASB).

Abstract: Finance issues – Green debt and equity investment opportunities

The adoption of soil stewardship practices across the agricultural sector is critical to address soil degradation and support farm resilience and profitability. Beyond supporting agricultural production, soil stewardship can promote various other ecosystem services relating to flood control, water purification, climate regulation and the promotion of biodiversity[1]. Despite the apparent benefits, outside of the receipt of ACCUs for soil carbon sequestration, there are limited direct financial incentives for Australian farming soil stewards. This presentation explores the role of financial market participants in helping to address this challenge and ensure that farmers are appropriately rewarded for their investments in soil health.

The presentation focuses on banking and investment markets and how soil stewards might leverage on green banking and responsible investment innovations. The discussion draws on outcomes of projects - supported by the Soil CRC and the Australian Accounting Standards Board (AASB) – which have focused on opportunities to activate financial markets to reward soil stewardship through the enhanced provision of value-relevant soil information to bankers and investors.

[1]Greiner, L., Keller, A., Grêt-Regamey, A., & Papritz, A. (2017). Soil function assessment: review of methods for quantifying the contributions of soils to ecosystem services. Land use policy, 69, 224-237.

Speakers: Session 2

Prof Mark Morrison
Faculty of Business, Justice and Behavioural Sciences, Charles Sturt University / Soil CRC

Mark is Associate Dean Research in the Faculty of Business, Justice and Behavioural Sciences. He is an applied economist, with substantial experience in marketing and entrepreneurship, and in agricultural and environmental projects. In recent years he has led various Soil CRC funded projects focusing on activating markets to better reward landholders for use of soil stewardship practices.

He has previously completed projects on use of compost and evaluation of soil carbon trading. He has completed or received 30 external research grants valued at about $3 million, and completed 24 consultancy projects working with CSIRO, Murray Darling Basin Authority, IPART, Sydney Water, Australian Communications Authority, Museums and Galleries NSW, ABARE, NSW Department of Primary Industries and others. He has been an expert witness in the Federal Court where he oversaw the first successful use of choice modelling in an Australian court, and recently was an expert witness for RMS in the NSW Land and Environment Court.

Abstract: Activating consumer and other markets to better reward soil stewardship practices

Financial incentives for farmers to use good soil management techniques are limited. Consumer markets offer one opportunity for farmers to realise a financial benefit; however, there is a lack of understanding about consumers' knowledge about soil; their willingness to pay; and communication strategies and messages that might be effective at motivating consumers, or different groups of consumers, to be willing to pay for soil stewardship practices. There is also a need to understand the opportunities and barriers to rewarding farmers for good soil stewardship across the value chain, including in food retail and manufacturing organisations.

To address these questions, we are conducting a project involving a series of consumer focus groups; interviews with farmer groups, food retailers and manufacturers and other value chain stakeholders; the development of a set of communications materials about soil; and a survey of 5000+ consumers. These materials took the form of marketing collateral for a fictional brand called Nurtured Lands, and included a brand logo, TV commercial style videos testing different messages about the benefits of soil stewardship; and two websites including infographics. As well as gathering insight into consumer preferences and willingness to pay, value chain interviews (farmer groups, retail and manufacturing) provided perspectives on whether they thought consumers would pay more, and interest in their organisation rewarding farmers for soil management. The current findings from this study will be discussed in the presentation.

Speakers: Session 3

Dr Kate Burke
Managing Director, Think Agri

Dr Kate Burke is an agri-strategist, author and keynote speaker with specialist knowledge in the science and strategy of broadacre farming and direct investment in farmland. Kate connects the dots between science, commerce and human behaviour to build better farmers, better farms and better understanding to help policy makers, researchers and supply chain participants play their part in a sustainable and prosperous future for Australian Agriculture.

Kate recently published *Crops People Money and You, The Art of Excellent Farming and Better Returns* and regularly contributes to The Guardian Newspaper and Rural Business. Kate was also the 2021 recipient of the GRDC Seed of light award.

Abstract: Soil health improvement in practice - opportunities and challenges for Australian farm businesses

Many dryland cropping farms are sophisticated complex and high-turnover businesses operating from a substantial land asset ranging from $5M to $50M and beyond. These are multi-generational family owned businesses who derive an illiquid return from the capital appreciation of the land over time, and a cash return from growing a portfolio of crops each year, sometimes in combination with pasture and a grazing enterprise.

Highly profitable farms are highly productive. They cost effectively produce the optimum amount of plant and animal product that the climate and soil capacity will allow each season, all while mitigating various risks. Losses are contained in low potential years, and profits are optimised in favourable seasons. The adaptive capacity required to navigate the volatility from one season to the next is enhanced when the farm is viewed as a whole system with complex interactions between humans, natural resources and external influences.

A review of farm business performance data suggests that 75 to 80 percent of broadacre farm businesses are not reaching their water limited profit potential. They could be earning 2 to 4 times more by improving productivity cost effectively. Higher rainfall zones have greater opportunities to improve profits on the back of improved productivity.

Soil health improvement in the context of the whole farm system is paramount to building better farms, better returns and by extension thriving families and thriving rural communities

Prof David Pannell

Professor of Agricultural and Resource Economics, University of WA

David Pannell is Professor of Agricultural and Resource Economics, University of Western Australia; Director, Co-Centre for Environmental Economics and Policy; ARC Federation Fellow (2007-2012); Distinguished Fellow and past president of the Australian Agricultural and Resource Economics Society; Fellow of the Academy of Social Sciences in Australia; and a Director of Natural Decisions Pty Ltd. His research includes the economics of land, water and nature conservation; environmental policy; farmer adoption of conservation practices; risk; and economics of farming systems. David has won awards for his research in the USA, Australia, Canada and the UK.

Abstract: Farmer behaviour change and adoption of new practices

Agriculture is highly dynamic, with farming practices changing regularly in response to opportunities and challenges. Research into the drivers and barriers to farmers adopting a new practice provides lessons that are relevant to practices that are intended to improve soil health, including the following. Farmers are heterogeneous, so it is rarely the case that all farmers adopt a particular practice. Adoption is often slower than people expect, especially for relatively complex practices. Farmers actively seek to learn about new practices they are interested in, and adoption depends on how difficult it is to learn, and what they learn. It is more difficult to learn about the performance of practices where the effects are not visible (e.g. sub-soil), the effects are delayed, or the practice is very different from previously used practices. The attractiveness of a practice to a farmer depends on what their goals are and how well the practice delivers those goals. The factors with the biggest influence on adoption vary over time: social and network factors are most important prior to farmers doing a trial themselves, but after that, the farmers' personal experience becomes more important. Each practice has a unique adoption story depending on its specific characteristics and context. Quantifying adoption is important for designing and evaluating policies to promote particular practices.

Speakers: Session 3

Dr Oliver Knox
Associate Professor of Soil Systems Biology, University of New England

Oliver is from Scotland with degrees from the University of Aberdeen in Genetics and Plant and Soil Sciences. Oliver's work, before moving to Australian in 2003 to work in the cotton industry, had covered rhizosphere development and the ecology of the mycorrhizae of the Arctic. In Australia he looked at how genetically modified (GM) cotton interacted with the soil microbiome before returning to Scotland in 2008 where he focused on bulky organic fertilisers including composts, manures, seaweed, digestate and biochar in various agricultural systems. Oliver returned to Australia in 2014 to take up a Cotton RDC co-funded post as the co-ordinator of Cotton Hub at UNE, which seeks to deliver cross disciplinary work on the issues affecting production of sustainable cotton.

Oliver's interests are holistic, working with cropping systems and how the plant, abiotic and biotic soil components interact at a range of scales - from broad acre farm management to the microscopic life of our soils. To connect these scales he has been instrumental in developing and delivering #soilyourundies to Australia as a means to assess your soil health.

Abstract: Sustainable cotton production - an example of what drives change

Cotton is a fibre and oil crop of global significance and is grown in numerous countries. Since becoming the first Australian agricultural industry to independently assess its environmental impacts in 1991, the Australian cotton industry has been quietly improving its sustainability. It has a proud record of improvement in many areas, driven by an innovative and collaborative industry that is comprised of a grower peak body representing up to 1500 farms (Cotton Australia), the Cotton Research and Development Corporation, a joint venture organisation to extend research to growers (CottonInfo), and a voluntary certification standard (myBMP), which provides cotton growers guidance for legal requirements, industry recognised best practice standards, and aspirational or innovative practices.

More recently, the Australian cotton industry has identified nine priority environmental, social and economic topics to be managed under its sustainability framework - PLANET. PEOPLE. PADDOCK. Soil, its sustainable use and its health is one of these priority topics. To this end, the industry has undertaken extensive consideration of what constitutes soil health, how it might be managed or improved and what a framework to facilitate grower uptake of methods to improve or maintain their soil health might look like. This builds on past industry work to address soil health, and to raise awareness of soil fundamentals through innovative work such as the Soil Your Undies programme. The resultant framework will be presented at this meeting for consideration and comment, but to date has been warmly received by farmers and consultants ahead of any wider implementation and adoption plans. Having grower buy-in and involvement in development of any practice change system is a strength of the cotton industry and one of the reasons for its ability to drive practice change and promote more sustainable farming practices.

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