Mallee Farmer

ISSUE #27 WINTER EDITION 2026

Featuring

Mallee soil insights with Dr Cassie Schefe

Regional Drought Resilience program wrap-up

Expansion of the MSF Soils Connect platform

BCG organic nitrogen fertiliser trials

Autumn observations: Monitoring wind erosion and land management

And much more.

mallee catchment management authority

Contents

Acknowledgement
This publication is supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Australian Government | mallee catchment management authority

Publisher:
Mallee Catchment Management Authority
ISSN: 1839 - 2229

Front cover photo:
Dr Cassie Schefe
AgriSci Pty Ltd
Photo: Agriculture Victoria

Acknowledgement of Country

Mallee CMA acknowledges and respects Traditional Owners, Aboriginal communities and organisations. We recognise the diversity of their cultures and the deep connections they have with Victoria's lands and waters. We value partnerships with them for the health of people and country.

Mallee CMA pay their respects to Elders past and present, and recognise the primacy of Traditional Owners' obligations, rights and responsibilities to use and care for their traditional lands and waters.

Chair's Report

Welcome to the latest edition of Mallee Farmer, a Mallee Catchment Management Authority (CMA) publication designed to keep farmers across the region in the know.

In this edition you'll find many quality reads, including an interview with soil scientist Dr. Cassie Schefe, where she provides valuable insights into what makes Mallee soil so unique, the practices that deliver the biggest benefits, and the role soils play in reducing carbon footprints.

You can also read about how Mallee CMA is supporting drought resilience in the Mallee, the impact of high fuel and fertiliser prices on local farms, and how the native Mallee Looper caterpillar is affecting Mallee woodlands across Victoria and South Australia.

As chair of Mallee CMA, I'd like to thank each and every one of you who subscribe to, read and/or contribute to Mallee Farmer – it's a publication we are very proud to bring to you, and we hope you enjoy it.

We always love to hear your thoughts, feedback and ideas, so please don't hesitate to reach out to our team at info@malleecma.com.au.

You'll also find a feedback survey in this edition that we'd love for you to participate in – after all, this is your publication and we want to make sure our readers are getting the most out of it.

A quick scan of the QR code will help Mallee CMA deliver the content you need and enjoy!

Until the next edition,

Narelle Heard
Board Chair
Mallee Catchment Management Authority.

Would you like a copy of the Mallee Farmer?

Send us your contact information and we will post or email a copy to you.

Email: reception@malleecma.com.au

Previous and current publications
Two editions of the Mallee Farmer are produced each year. Jump online and click on the link to subscribe at **www.malleecma.com.au**

Australian Government
Department of Agriculture, Fisheries and Forestry

Natural Heritage Trust

Sustainable Agriculture Facilitators (SAFs)

Sustainable Agriculture Facilitators (SAFs) are locals who work with farmers, landholders, community groups and agricultural industries to promote climate-smart, sustainable farming practices.

They provide relevant information and resources, and facilitate local connections to help support a more sustainable and resilient future for agriculture.

- **Free service:** SAFs can be contacted directly and free of charge.
- **Local knowledge:** Each SAF provides region-specific information and support.
- **National coverage:** SAFs are located across Australia, hosted by Natural Resource Management (NRM) organisations.

What do SAFs provide?

Information and advice

SAFs share practical, up-to-date information including:

- best practice in natural resource management and sustainable agriculture
- biodiversity, carbon and other emerging markets
- on-farm emissions reduction and climate resilience strategies
- government policies, programs and tools
- upcoming funding and grant opportunities
- local events, workshops, training and communities of practice.

Connections and partnerships

SAFs connect people and organisations to strengthen collaboration and outcomes including:

- other farmers, landholders, landcare and community groups or industry
- First Nations peoples and organisations
- extension officers (e.g. Regional Soil Coordinators, adoption officers in Drought Resilience Adoption and Innovation Hubs, Carbon Farming Outreach advisors)
- projects and grantees supported through the Natural Heritage Trust or Future Drought Fund.

Alignment with government priorities

The Australian Government has invested over $40 million in the SAF network through the Climate-Smart Agriculture Program, funded by the Natural Heritage Trust. SAFs play a key role in delivering sustainable agriculture initiatives regionally, building on the success of the Regional Agriculture Landcare Facilitator (RALF) network (2017–2023).

How to contact a SAF

Scan the QR code to find your local Sustainable Agriculture Facilitator or for more about climate-smart agriculture.

agriculture.gov.au

Sustainable Agriculture Facilitator update

By Cameron Flowers, Mallee CMA

The 2026 season so far has been a rollercoaster ride for the Mallee. We started the year in very dry conditions, with little stored soil moisture, and a hot summer that brought bushfires to parts of the region and across the state. Many local farmers were directly involved, turning out as CFA volunteers and helping their communities during what was a challenging time.

Things shifted quickly in March, with widespread rainfall across much of the Mallee. Some areas recorded more than 100mm, and in parts of the southeast Mallee water lay in paddocks like small lakes. While the rain has created some challenges, including access issues, increased weed control efforts and bogged spray units, it has been welcome for recharging soil moisture and setting up the season ahead.

In the lead up to sowing, I attended some excellent agriculture events and workshops around the region. Birchip Cropping Group's Trials Review day was a good chance to hear about research results from the 2025 season, while the BCG Soils Day at Berriwillock featured great discussions around soil constraints and management options, with a soil pit and presentations from Dr Cassie Schefe. Mallee seeps were also a key focus at BCG workshops held in Speed and Ouyen, highlighting an issue that continues to affect more areas of the region.

I also attended the Mallee Sustainable Farming Research update in Manangatang where they presented on their cropping trials, carbon farming, and Mallee seeps projects to an audience of farmers and agronomists. The Victorian CMA's Carbon Farming Outreach Program has now finished, following a series of workshops held across the Mallee. For those that missed it, a webinar recording with Dr Cassie Schefe is available for viewing on the Mallee CMA YouTube page.

Pest Management field days were held at Birchip and Ouyen, organised by South East Mallee Landcare and Mallee Landcare Group. The workshops covered current best practice control methods for feral animals, legal requirements and safe use of control tools such as baiting and trapping, how predator control supports native ground dwelling fauna, and opportunities to control efforts across neighboring properties. With reports of pest animals increasing this was an ideal time to promote surveillance and control measures.

There have been reports of increasing mouse numbers in South Australia, which provides a reminder to monitor paddocks and around farm yards and be prepared to act if activity shows signs of increasing.

Here's hoping for a good growing season across our Mallee farms.

Cameron Flowers
Sustainable Agriculture Facilitator, Mallee CMA

Mallee soil insights - Q&A with Dr Cassie Schefe

By Jack Roney, Mallee CMA

Understanding soils is critical to making the most of every season in the Mallee. With increasing pressure on productivity, input costs and sustainability, growers are looking for practical ways to manage constraints while getting the most out of their system.

Mallee CMA caught up with soil scientist Dr Cassie Schefe to talk about what she's seeing across the region, what's working on-farm, and where the biggest opportunities lie.

Tell us a bit about your background and what a typical day looks like.

I was fortunate to be a cadet with the Victorian DPI, which supported me through my Ag Science degree before commencing work at the Rutherglen Research Institute as a soil chemistry research scientist. I later completed a PhD looking at carbon-phosphorus interactions in acid soils.

In 2014 I moved into a more farmer-focused role with the Riverine Plains farming group. As a white-coat

researcher, working directly with farmers was incredibly humbling and showed me how complex modern farming systems really are.

In 2019, AgriSci Pty Ltd was established as a partnership with my husband and research agronomist, David Hawkey, to provide support from soil sampling and constraint assessment through to workshops, projects and sustainability reporting.

A typical day could be anything from soil pits in the Mallee to board rooms in Sydney to farmer meetings in pubs in WA!

What led you to specialise in soil science?
I started university thinking I would go into ruminant biochemistry and nutrition, before discovering soil science during a DPI placement.

On one level, it's just dirt, but the more you delve into it, the more you see the complexity of biological, chemical and physical interactions. When you overlay that with machinery, agronomy, seasonal conditions and profitability, there are always multiple factors at play.

Solving soil issues has to be done within that broader system and, most importantly, in discussion with the farmer or land manager. Farmers don't want a shiny report with broad recommendations. They need someone they trust to break issues down into something that makes sense in their system and work through practical actions.

What stands out to you about farming in the Mallee?
I have a huge amount of respect for Mallee farmers. To be successful in this environment requires incredible risk management, but also high adoption of sustainable practices to protect the soil and capture water efficiently.

What makes Mallee soils unique?
The sandy soils are quite unique, and the dune systems add another layer of complexity in terms of trafficability, erosion and compaction risk.

While many of these soils were historically neutral to alkaline, acidity is becoming more prevalent due to increased productivity and nitrogen cycling from fertilisers and legumes.

What soil management practices are delivering the biggest benefits?
Maintaining stubble residues and soil cover over summer is key in the Mallee to minimise wind erosion and capture rainfall. Supporting soil fertility is also important so plants can respond to available moisture and make use of applied nitrogen.

For those soils which are becoming acidic, lime applications should be considered as a proactive capital investment for long term productivity.

What are some practical changes farmers can make?
Establishing a network of GPS-located soil sampling sites across the farm is a great long-term investment.

While regular depth sampling can seem costly, it provides valuable information to identify emerging issues and prioritise spending. For example, if pH starts declining, you can plan lime applications before acidity becomes limiting.

It's also important to refine rotations with legumes to maintain fertility benefits while ensuring enough residue to protect the soil over summer.

Can you tell us about the 'Cool Soils Initiative' and the work you're involved in?
The Cool Soil Initiative was established to support cropping farmers in understanding the key drivers behind their on-farm emissions.

It's a free program with no contracts, which allows farmers to get a handle on their emissions with support, while also contributing to regional-level data. It also brings companies together to invest in a shared approach to sustainability reporting.

My role as Principal Scientist, is supporting the science and on-ground teams to deliver reporting that acknowledges good practices already adopted by Australian farmers, while supporting farmers to test new practices.

Do soils play a role in reducing carbon footprint?
If soil carbon levels are low, improved management and increased biomass can lift those levels and help offset emissions.

However, soil carbon fluctuates with seasonal conditions, so increases aren't always maintained. The bigger benefit is maintaining soil organic matter for soil function, rather than focusing purely on carbon outcomes.

What questions are farmers asking at the moment?
A common question is whether farmers will be penalised for high emission values.

Based on current knowledge, that's unlikely. Australian farmers are already relatively low emission compared to other countries, and seasonal variability makes comparisons difficult.

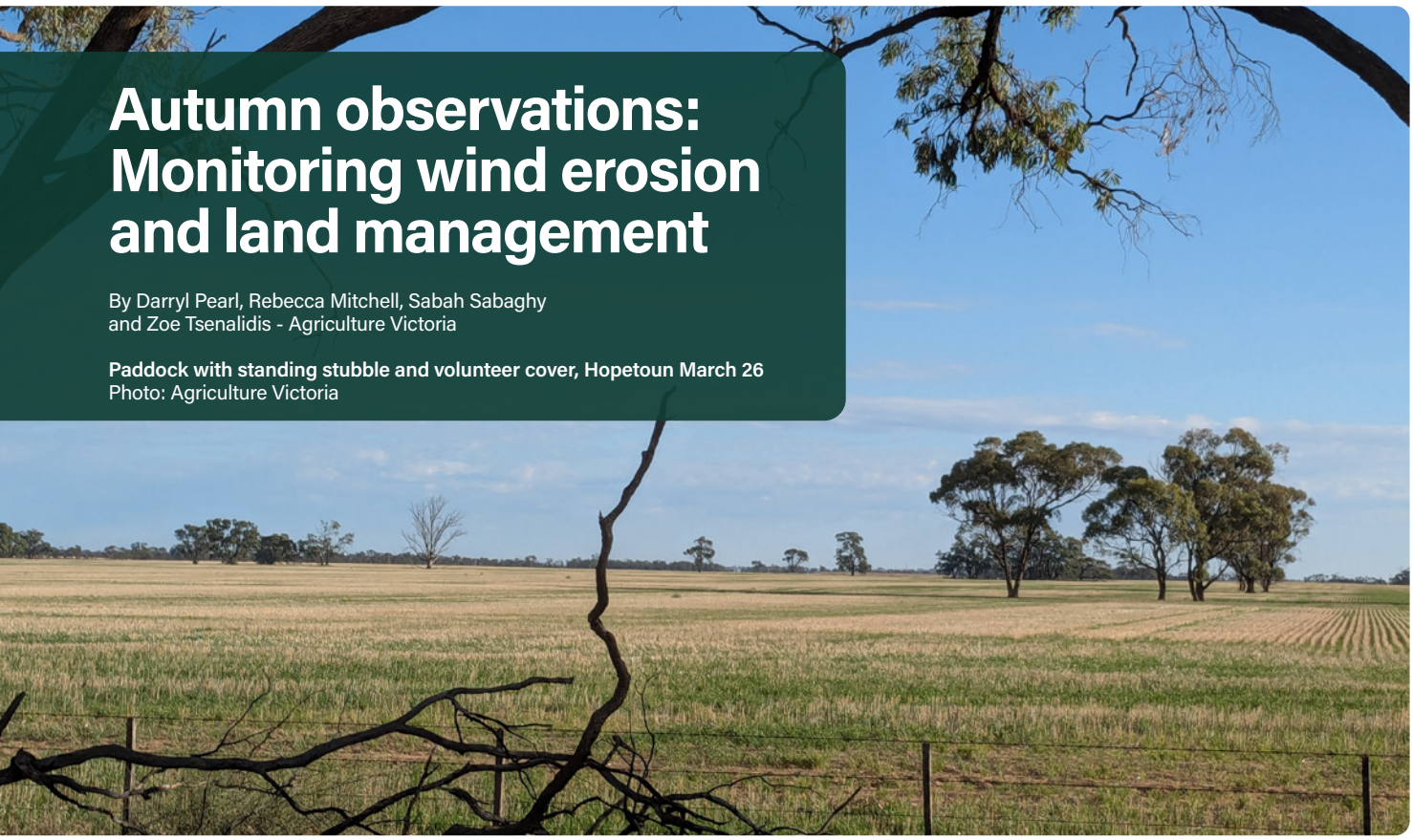
Where are soils heading, and what should farmers watch?
As we get better at farming, the rate of soil acidification is increasing. I would encourage all farmers to keep an eye on pH through depth-incremented sampling. It is much cheaper and easier to proactively maintain soil pH levels, rather than wait until acidity becomes a limiting factor on production and yield.

What gives you confidence about the future?
For farmers to be successful in marginal environments such as the Mallee, they need to be responsive to seasonal conditions, rather than run by a rigid rule book. This agility, combined with an ethos of strong land stewardship and sustainable practice, gives me confidence in the future of farming in the Mallee.

For further information, contact:
Dr Cassandra Schefe, AgriSci Pty Ltd
Mobile: 0419 238 798
Email: cassandra@agrisci.com.au

Autumn observations: Monitoring wind erosion and land management

By Darryl Pearl, Rebecca Mitchell, Sabah Sabaghy and Zoe Tsenalidis - Agriculture Victoria



Paddock with standing stubble and volunteer cover, Hopetoun March 26
Photo: Agriculture Victoria

Key messages

- Wind erosion poses a high risk in the Mallee, with the potential to affect 97% of dryland cropping areas, threaten air quality and the long-term viability of agricultural businesses.
- Wind speed and direction, soil moisture and land management all affect the degree and impact of wind erosion and maintaining ground cover is a key way to reduce its impact.
- The 2026 autumn transect assessed 1,138 paddocks between 18 and 24 March 2026, capturing ground cover, land management, the presence of livestock and evidence of erosion.
- This information provides seasonal context for observed ground cover and land management, contributing to the climatic condition sections of the Mallee Wind Erosion and Land Use Monitoring framework, and helps identify changes in land management and pre-sowing practices over time.
- Rainfall across summer 2025-26 and in March 2026 influenced ground cover in the Mallee.
- At the time of the transect survey, 89.2% of the paddocks were covered with stubble, 9.3% covered with pasture and the remaining 1.5% were bare paddocks.
- Close to 11% (125 paddocks) of paddocks surveyed showed signs of erosion, a 9% increase from 2025. Most of this erosion was observed on 2025 legume and cereal paddocks. Erosion presented mostly as bald spots (64.9%), compared to 36.5% in 2025. Last year, 72.8% of the observed erosion was on dune crests compared to 31% in 2026, a decrease of 41.8%. These shifts are likely the result of the rainfall seen in the 2025-26 summer and March 2026 and the types of crops grown in 2025.

2026 Autumn roadside survey

Seasonal climatic conditions

Climatic conditions influence the amount of ground cover present in autumn. Seasonal conditions from the previous year significantly affect crop residue levels remaining after harvest. In 2025, growing season rainfall across the Mallee was decile 2 to 3, with lower yields, biomass and ground cover predicted. However, efficient farm management and July and late October rainfall, enabled most crops to achieve average to above-average yields, except in the northern Mallee where late rainfall was less able to be utilised by crops, particularly barley.

Summer 2025-26 rainfall was highly variable with monthly totals ranging from decile one to 10. Summer rainfall totals were decile 2 to 3 in Mildura, Murrayville and Werrimull, decile 5 to 6 in Sea Lake and Hopetoun, decile 8 in Swan Hill and Birchip and decile 10 for Ouyen, which received 119.2 mm in February (Table 1).

In early March, a few weeks before the autumn transect survey was conducted, high rainfall events across the Mallee occurred, with all regions receiving decile 10 rainfall for the month, increasing confidence and active management of weeds/volunteer crops to capitalise and bank soil moisture for the upcoming season. To maximise biomass, early sowing of feed crops was also observed on mixed cropping/grazing farms and by those who grow hay.

Table 1: Rainfall totals (mm) and deciles for the Mallee CMA region for 2025/6

	Mildura	Decile	Ouyen	Decile	Sea Lake	Decile	Swan Hill	Decile
December '25	6.6	4	13.6	5	27.1	8	22	7
January	0.0	1	0.0	1	0.2	2	13.4	6
February	15	7	119.2	10	21.6	7	51.8	8
March	166.6	HR	114.6	HR	189.6	HR	101.2	10
April	2.6	3	4.0	3	5.8	3	1.2	2
Summer '25-'26	21.6	2	132.8	10	48.9	5	87.2	8
Year to Date	184.2	2	237.8	2	217.2	1	167.6	2
	Hopetoun	Decile	Birchip	Decile	Murrayville	Decile	Werrimull	Decile
December '25	14	5	18	6	5.2	3	8.6	5
January	0	1	7.4	4	0	1	0	1
February	51.2	9	63	10	17.2	7	11.6	6
March	95.6	10	113.2	10	51.2	10	141.8	HR
April	7.2	3	6.6	3	10.2	4	4.0	3
Summer '25-'26	65.2	6	88.4	8	22.4	2	20.2	3
Year to Date	154.0	2	190.2	1	78.6	2	157.4	2

HR: Highest in Record
Source: Australian Bureau of Meteorology, Queensland Department of Agriculture and Fisheries

Primary cover

The autumn roadside transect survey assessed a total of 1,138 paddocks. At the time of the transect survey, 89.2% of the paddocks were covered with stubble. 9.3% of all paddocks surveyed were covered with pasture and the remaining 1.5% of paddocks were bare.

Erosion

Of the 1,138 paddocks surveyed, 125 (11%) showed signs of erosion, a 9% increase from 2025 (Figure 1).

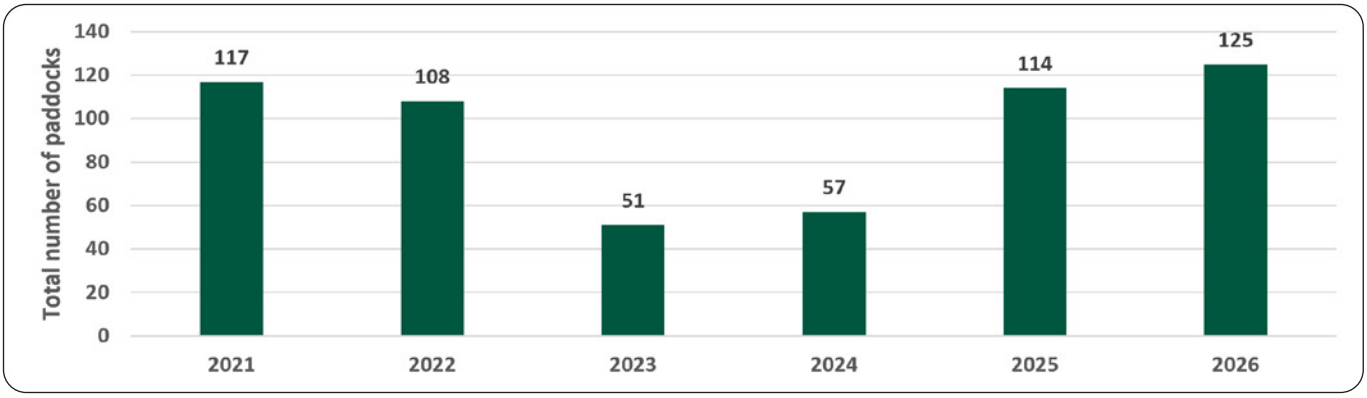


Figure 1: Total number of paddocks surveyed showing signs of erosion, 2021 to 2026.

Some paddocks experience multiple types of erosion. Across all paddocks exhibiting signs of erosion, 31% occurred on dune crests, while 51% were bald spots in paddocks. Visible drift and erosion between the stubble rows made up 2.8% and 13%, respectively. Two paddocks had dust blowing at the time of the survey (Figure 2).

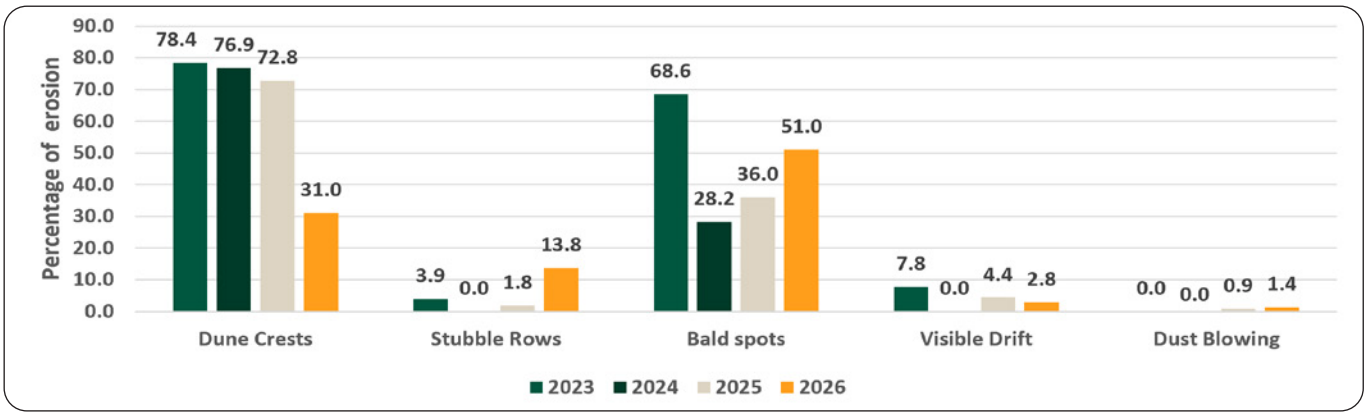


Figure 2: Erosion types observed in paddocks as a percentage of total erosion, 2023 to 2026.

Comparison of spring 2025 cover types with autumn 2026 paddocks highlights that erosion mostly affected paddocks planted to legumes in 2025 (Figure 3). Increased erosion in legume paddocks was linked to lower biomass due to late establishment, a below average winter and spring rainfall (Table 1). Reduced post-harvest cover was also due to legumes being used for manure, grazing, or hay and exposure to early summer rainfall. These factors made legumes especially prone to bald spot formation. Erosion on dune crests decreased by 41.8% while bald spots increased by 15.1%. Dunes were also observed to be more stable due to the crusting effect of rain.

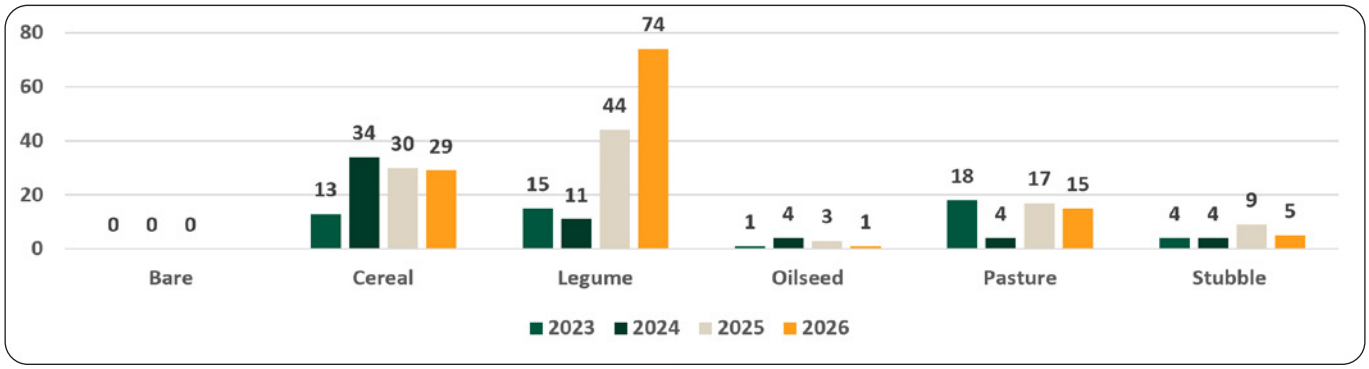


Figure 3: 2025 spring cover types displaying signs of erosion in autumn 2026.

At the time of the transect survey, 23 paddocks (2% of paddocks surveyed) were being grazed, 20 by sheep and 3 by cattle.

Grazing stubble paddocks over summer and through autumn need to be carefully managed to ensure ground cover levels are not reduced below the recommended minimum level of 50% ground cover. If paddocks are overstocked, or grazed for too long, it may lead to issues with wind erosion, particularly in the high and very high susceptibility land classes.

Vegetation cover monitoring from satellites

Fractional ground cover datasets are used to quantify vegetation coverage. This dataset is produced using imagery from the MODIS satellite on a monthly basis. We then use this data to calculate the area and quality of cover and to determine whether vegetation is living, dead or starting to die off.

A threshold of greater than 50% vegetation cover has been established nationally as the target to protect soils from wind erosion. Maps in Figure 4 and Figure 5 show areas protected from wind erosion in December 2025 and March 2026. Green areas on the map indicate wind erosion protection and brown areas reveal wind erosion exposure. As of December 2025, vegetation cover in the Mallee was low, indicating high vulnerability to wind erosion. Ned's Corner and Millewa show the lowest protection against wind erosion at about 30%, while Raak and Central Mallee showed better conditions at around 60% to 70%.

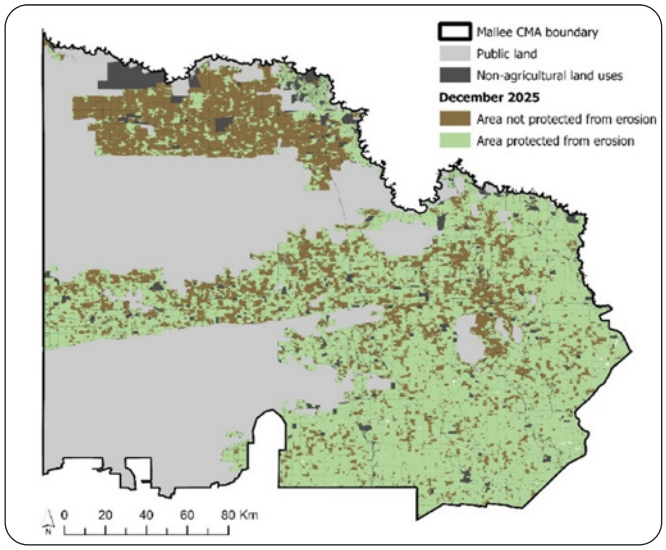


Figure 4: Soil protection from wind erosion across the Mallee CMA in December 2025.

By March 2026, vegetation cover had generally decreased across much of the Mallee, increasing overall wind erosion risk. Conditions in the Millewa region however showed improvement in March 2026 relative to December 2025, likely attributable to summer rainfall that promoted volunteer crop growth and enhanced ground cover. The area still continues to be notably susceptible to wind erosion.

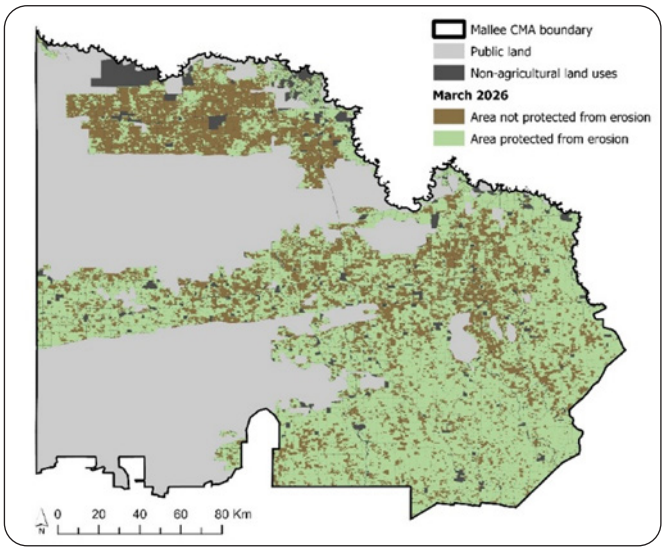


Figure 5: Soil protection from wind erosion across the Mallee CMA in March 2026.

Acknowledgements

This project is supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Evaluating the efficacy of organic-based nitrogen fertiliser

By Isabella Atkins, Birchip Cropping Group

Hand spreading treatments.
Photo: Birchip Cropping Group.

Research is being conducted by the Birchip Cropping Group to investigate if three organic-based slow-release nitrogen fertilisers could help Mallee farmers improve their Nitrogen Use Efficiency (NUE).

Three organic-based nitrogen fertilisers are being tested:

- Peanut shell biochar-based urea
- Cow manure-based urea
- Green waste compost-based urea

In 2025 these three organic urea-based nitrogen fertilisers were tested in wheat field trials and glasshouse crops, to simulate on farm applications of the product and evaluate their efficacy in farming systems and effects on both the plant and the soil.

All three products have been previously researched in different farming systems to various degrees, and all have been selected with sustainability in mind. In BCG's field trial at Karyrie, these products were tested against conventional urea and a control with no product. All treatments received the same equivalent N of 45kg/ha when sown, with no topdressing throughout the year (refer to Table 1).

All 3 organic-based N fertilisers yielded statistically the same as the 4th N treatment of urea, and all 3 organic-based N treatments and urea outperformed the control which had no N applied. The story was similar for grain protein, with all 3 organic-based N treatments and urea having statistically similar protein levels in the H2 class, and all 4 N treatments performing better than the control, which had a protein classification of ASW1.

The 2025 growing season produced results that saw organic-based urea fertilisers performance on par with urea, which is important as there shouldn't be a yield penalty for switching to a more sustainable fertiliser. Previous research has shown that applying products that release nitrogen slower may minimise losses and increase the efficacy of inputs. Not only can this be beneficial for crops, but the slower release of nitrogen

can reduce soil acidification and decrease nitrogen loss to the atmosphere from denitrification which contributes to greenhouse gases.

In previous smaller scale glasshouse trials, organic-based nitrogen fertiliser demonstrated higher NUE, higher crop yields and lower soil nitrogen losses than conventional urea fertilisers.

This trial will assess nitrogen uptake, yield and grain quality in Scepter wheat (2025) and Neo barley (2026), as well as investigating potential impacts on soil nitrogen dynamics and soil health indicators over time.
The first-year results of this trial suggest that the novel organic-based nitrogen fertilisers can match the performance of conventional urea, in yield and quality, under the conditions of a decile 2 rainfall year. We can anticipate that the organic-based nitrogen fertilisers have minimal, yet important, effects on soil through the providing of organic matter within the fertiliser that can encourage soil microbial activity and reduce the nitrogen mining on soil organic matter.

This project, led by Griffith University in QLD and funded by the Soil CRC, will run over the 2025 and 2026 growing seasons and will aim to evaluate the performance of organic-based fertilisers in major Australian cropping systems through trial sites with Birchip Cropping Group, Burdekin Productivity Systems and Central Western Farming Systems.

Table 1: Nitrogen Treatments

Treatment	Nitrogen %	Method	Rate (kg/ha)
Control	0	n/a	n/a
Urea	46	Applied at sowing (via tyne boot)	98
Cow manure-based urea	10.8	Hand spread in crop rows prior to sowing	417
Peanut shell biochar-based urea	19.4	Hand spread in crop rows prior to sowing	232
Green waste-based urea	11.2	Hand spread in crop rows prior to sowing	400

Table 2: Nitrogen Treatment outcomes

Treatment	Yield (t/ha)	Grain number (grains/m2)	Thousand Grain Weight (g)	Protein (%)	Screenings (%)
Control	1.63a	4259a	38.3a	10.08a	3.4a
Urea	1.76b	4693b	37.6a	12.15b	2.8ab
Cow manure-based urea	1.78b	4724b	37.7a	11.65c	2.2b
Peanut shell biochar-based urea	1.81b	4758b	37.9a	12.30b	2.6b
Green waste-based urea	1.81b	4678b	38.8a	11.73bc	2.5b
Sig. diff. **LSD (P = 0.05)** **CV%**	**0.025** **0.12** **4.3**	**0.07** **371** **5.2**	**0.728** **NS** **3.6**	**<0.001** **0.47** **2.6**	**0.07** **0.8** **19.9**

Superscript letters indicate significant differences. LSD = Least Significant Difference (P = 0.05), CV = Coefficient of Variation.

For further information, please contact:
Isabella Atkins, Birchip Cropping Group
Mobile: 0459 702 547
Email: isabella.atkins@bcg.org.au

Acknowledgements
This research was funded by the Soil CRC as part of the 'Organic-Based Nitrogen Fertilisers for Crop Production and Soil Health project (3.1.009), led by Griffith University.

The caterpillar that's eating our Mallee trees

By Fiona Murdoch, Wildlife Unlimited Ltd

The Mallee Looper caterpillar grows to 6 cm in length and can be red, orange or green.
Photo: Fiona Murdoch.

If you've noticed patches of Mallee trees that look like they've been through a fire — bare branches, no leaves — you haven't imagined it. A native caterpillar called the Mallee Looper has been quietly eating its way through hundreds of thousands of hectares of Mallee woodlands in Victoria and South Australia.

The caterpillar outbreak cycle
The Mallee Looper is the caterpillar of a native moth in the genus Arhodia. Recently, caterpillars have become superabundant, with outbreaks appearing annually since 2021. In 2023, between 150,000 and 250,000 hectares of Mallee Woodland were affected in South Australia alone. The outbreaks have since been tracking south and east into Victoria, reaching Hattah Kulkyne National Park and surrounding areas in early 2025.

Moths emerge from underground pupae in the warmer months. Emergence is synchronised and appears to follow approximately two weeks after rainfall events. In outbreak areas, moths appear in large numbers attracted to lights at night.

Females lay 400-700 eggs and ten days later the caterpillars emerge. Loopers are small initially, around 4 mm long, and do little damage. But as the caterpillars reach full size of 40-60 mm long, around day 20–30 after hatching, they become very hungry. There can be a thousand caterpillars on a tree and they can strip an entire tree of every leaf in a matter of days. In outbreak areas, large patches of Mallee woodlands can be defoliated. So far, the damage is limited to our native Mallee Eucalypts.

Will the trees recover?
Generally, yes. Mallee trees are built to survive. Their lignotuber — a massive underground storage organ holding carbohydrate reserves — allows them to regrow after fire or drought, and they can regrow their leaves after being eaten by Mallee Loopers.

However, complete defoliation, year after year, can exhaust even a lignotuber. In the short-term, affected trees may have reduced flowering and fruiting as they direct resources to regrowing leaves. Consecutive years of severe impact, especially combined with drought, can be fatal. In parts of South Australia hit repeatedly since 2021, trees are beginning to die.

What we found in 2025–26
We have been monitoring Mallee Loopers in the Victorian Mallee.

Despite high moth numbers in late 2025, actual damage by caterpillars over summer was very low — our surveys found almost no caterpillars and little damage at sites badly affected the previous year. A series of heatwaves appears to have wiped out most caterpillars before they reached the damaging stage.

However, the large rainfall event in early March triggered a second emergence of moths. Signs of defoliation became evident in mid-May. Mallee Looper caterpillars were particularly noticeable in the fresh growth that appeared on Mallee trees following the March rains. This is the first time we have observed a second emergence period and suggests the Looper keeps some pupae

ISSUE #27 **WINTER EDITION 2026**

The Mallee Looper moth is pale brown with a variety of markings, and is about 2.5 cm across the wings.
Photo: Fiona Murdoch

"in reserve" underground waiting for optimal conditions. This "bet-hedging" strategy means that a single year of unfavourable conditions is unlikely to end the current outbreak.

Your help is needed
Mallee trees are an important part of our landscape. They're windbreaks protecting soil, crops and livestock, habitat for birds and other animals, and important resources for apiarists. We are slowly building our understanding of the triggers that have led to this outbreak, and monitoring for signs the outbreak may be weakening, or conversely, spreading to new areas. Your observations are an important part of this research — the more sightings we can collect across the landscape, the better our picture of the outbreak becomes.

What to look for - Signs of a Mallee Looper caterpillar outbreak:

- Trees suddenly stripped bare of leaves, particularly fresh growth
- Green, orange or red caterpillars, 30–55 mm long, rigid along branches or leaves. They have legs at the front and end of the body so move in a "looping" manner
- Fine frass (caterpillar droppings) and shredded leaves on the ground beneath affected trees

If you see damage:
Take a photo and log it on the free iNaturalist app. Search for the project Looking for Mallee Loopers and upload your observation. Your record feeds directly into the research.

For factsheets and regular research updates, visit malleeconservation.com.au/mallee-looper.

Repeated defoliation by the Mallee Looper caterpillar can contribute to tree death, particularly when combined with drought conditions.
Photo: Fiona Murdoch.

Acknowledgements
This project is part of the Regional Drought Resilience Planning program, jointly funded through the Australian Government's Future Drought Fund, the Victorian Government, and the Natural Resources Conservation Trust. Research is led by Wildlife Unlimited in partnership with Mallee Conservation.

MalleeFarmer 14

Reducing on-farm emissions through alternative stubble management

By Alison Frischke, Birchip Cropping Group

Dr Cassandra Schefe describing a soil pit at Simpson's, Berriwillock, March 2026.
Photo: Birchip Cropping Group.

A regional partnership of Mallee Catchment Management Authority, Agriculture Victoria, Birchip Cropping Group and Mallee Sustainable Farming is working with dryland farmers across the Victorian Mallee to identify and validate management practices that can support sustainability, productivity and profitability improvements under a variable and changing climate. Beginning in 2024, this four-year project is focusing on addressing a key challenge for Mallee farmers; maintaining groundcover at the level required to protect their most valuable resource: soil.

Working with local farmers across the southern Mallee, Birchip Cropping Group (BCG) is identifying stubble and other residue management practices that support productivity and soil health improvements, regardless of the season, while also understanding any associated implications for carbon emissions. This includes the management of stubbles and residues over dry season months, as well as enhancing plant production on unproductive paddock areas during the growing season which will lower emissions intensity for crop production.

During summer and autumn months, crop stubbles are the main source of groundcover on Mallee soils. While research shows that stubble management isn't always a major driver of yield, it influences crop establishment and often needs locally tailored approaches.

Across the Mallee, retaining standing residue helps protect fragile sandy soils by limiting moisture loss, improving rainfall capture, and reducing erosion.

On the other hand, heavier stubble loads in the wake of above average rainfall can create challenges for sowing subsequent crops; they can contribute to nitrogen tie-up, reduce the efficacy of pre-emergent herbicides, enhance disease carryover, and cause sowing issues such as poor soil throw, hair pinning, blockages, and tine buildup that bulldozes soil, which may impede crop emergence.

Dr Chris McDonough showing how to install a piezometer in a Mallee seep at joint event with Mallee Landcare, at Monaghan's, Speed, March 2026.
Photo: Birchip Cropping Group.

Mallee stubble management
Mallee farmers have a strong desire to protect their soils and landscapes and consider it important to retain stubbles after harvest. Cropping primarily uses no-till, draper and tine seeding systems, that can be coupled with inter-row sowing and coulters. A few growers use strip and disc systems to retain and sow into more residue, depending on the crops being grown and harvested.

On mixed farms, stubbles will be grazed until residual grain is consumed and best management will ensure at least 50 per cent (1 t/ha), but ideally 70 per cent (1.5-2 t/ha) ground cover is retained to protect soils. If stubbles need further management for sowing, they are modified by mulching (eg. prickle chain, slash, disc chain or speed till) or will be incorporated when strategic deep ripping is used to ameliorate sub-soil compaction in autumn. Baling straw is usually not necessary, and pre-sowing cultivations are essentially a thing of the past.

Burning stubbles is avoided as much as possible and will only be used strategically to burn chaff lines for controlling weed seeds, or if there are no alternatives available to the grower in high stubble load years. Repeated burning removes valuable biomass that would otherwise contribute to soil carbon and long-term soil function. Additionally, burning contributes to greenhouse gas emissions and impacts air quality, raising concerns for long-term environmental sustainability.

Monitoring demonstration sites
Ten farm monitoring sites have begun across the southern Mallee to demonstrate alternative practices that improve the sustainability, productivity, and profitability of low rainfall farming systems.

Since starting, soil health, crop production and stubble differences have been monitored between productive and less-productive paddock zones, to help identify practical solutions for growers.

Using these results and specialist expertise, several well attended field events have been held across the area to understand and discuss amelioration of the issues identified including soil compaction, sodicity, low carbon, eroded topsoil, saline scalds and Mallee seeps.

Demonstration site, Meatian
Areas of saline scalds are limiting crop production for the Nalder family in one of their paddocks at Meatian. Soil tests have measured salinity (ECe) at more than 20 dS/m in the soil layers from 0-40cm, which is toxic to plant growth.

It's recommended to cover scald areas with organic matter (straw, hay or dumping chaff carts) or sand, to provide cover (reducing capillary rise and surface evaporation) and promote crop or pasture establishment to begin improving soil health. Jake, who farms with his father Chris and brother Caleb, and agronomist Craig Muir, Agrivision, began ameliorating the site by spreading wheat straw across the scalded areas in February.

Figures 1 & 2: Variable oaten hay crop growth in spring 2025 (left) and resultant lack of stubble groundcover during summer 2026 in the saline scald area (right) at Meatian.
Photo: Birchip Cropping Group.

Figures 3 & 4: Wheat straw spread across saline scald area, after the rain (left) and wheat grain germinating in straw spread areas (right), March 2026.
Photo: Birchip Cropping Group.

In late February-early March, a large rain event fell across the region, delivering 135mm to their farm that would have diluted soil surface salts.

Wheat grain that came in the straw, germinated in areas where straw was thickest, but not on lightly covered areas suggesting salt levels were still too high on those areas.

The paddock was sown to barley in the last week of April, avoiding sowing into the straw-spread areas. The crop is germinating on unaffected ground, but not in the untreated saline scald areas. The project will continue to monitor changes to the soil, crop production, groundcover and emissions intensity in these areas over time, and will share locally relevant learnings about alternative stubble management and its impact on emissions.

For further information, please contact:
Alison Frischke, Birchip Cropping Group
Mobile: 0429 922 787
Email: alison@bcg.org.au

Acknowledgements
This project is supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Australian Government | BCG SHARED SOLUTIONS | mallee catchment management authority

Two legumes in four years: An option for the Mallee?

By Louise Brok, Mallee Sustainable Farming

Growers visiting the long-term rotation trial during the 'Millewa Driving Crop Walk' event, September 2025. Photo: Mallee Sustainable Farming.

Cropping systems in the Mallee are continually evolving. Over the past few decades, many farmers have moved towards more continuous cropping rotations. This shift has helped improve productivity and maintain groundcover; however, it has also created challenges around grass weed control and soil fertility. While cereals dominate many rotations, legumes such as field peas, lentils and vetch have become an important tool for adding diversity, managing weeds and improving soil fertility through nitrogen fixation.

Grower survey data confirms that legumes are already a regular feature of many Mallee rotations, with most growers including a legume crop approximately once every three years. The main reason for including a legume varies depending on grower priorities, but key drivers include weed management, nitrogen benefits and profitability.

While legumes are already widely used and the key benefits they can provide are well understood, there are still many questions to be answered around how best to include them in rotations to maximise the economic and sustainability benefits in the low rainfall Mallee. Answering such questions requires a longer-term approach. To support this, Mallee Sustainable Farming (MSF) has established the Legume-Based Cropping Systems project.

Testing rotations through long-term research

A long-term rotation trial was established in 2025 in the Millewa region of northwest Victoria. The trial aims to investigate how legumes can be used most effectively within cropping rotations, with a focus on economic returns, soil fertility and fertiliser management, groundcover, and weed management, to provide a comprehensive picture of the relative benefits of different rotations.

The key concept being explored is whether increasing the frequency of legumes in rotations could provide additional benefits for Mallee farming systems. The trial is testing systems that feature two legumes within a four-year rotation.

The performance of five cropping rotations is being assessed (Table 1), each incorporating legumes in two of the four phases. It is fully phased, meaning every phase of each rotation is present each year. This approach allows seasonal variability to be accounted for and helps build a clearer picture of rotation performance over time.

Table 1. Trial rotation treatments and crop phases, Millewa Long-term Rotation Trial 2025-2028. Varieties for each treatment were GIA Thunder lentil (IMI Lentil), Commodus CL barley, Tomahawk CL Plus wheat, GIA Metro lentil (Metro Lentil), PBA Twilight field pea, and Volga vetch.

	Phase			
Rotation	**1**	**2**	**3**	**4**
1	Vetch hay	Wheat	IMI Lentil	Barley
2	IMI Lentil	Wheat	IMI Lentil	Barley
3	Field pea	Wheat	IMI Lentil	Barley
4	Field pea	IMI Lentil	Wheat	Barley
5	Metro lentil	Wheat	Vetch brown manure	Barley

Engaging growers on the ground

Following the introduction of the long-term trial site at the Millewa Driving Crop Walk in September 2025, MSF has continued to engage growers through a series of events aimed at sharing information and encouraging discussion around legumes in Mallee rotations. Most recently, MSF hosted a Pre-Seeding Workshop in the Millewa, Victoria, and Mallee Research Update events in Manangatang and Murrayville, Victoria, and also in Dareton, NSW. These events provided opportunities for growers to learn more about the long-term trial, discuss their experiences with legumes, and provide feedback on how legumes are currently used within rotations.

Watch this space: exploring other ways to integrate legumes

Alongside the long-term rotation trial, MSF is also running a trial investigating the potential of intercropping legumes and cereals. This work explores whether nitrogen inputs could be reduced by sowing a nitrogen-fixing species with a cereal and removing it during the season. In this trial vetch was intercropped with wheat. This concept has been trialled and proved promising in other farming regions. At the Millewa site the focus is on assessing the feasibility of this approach in the low rainfall Mallee, the economics of such a system, and what the optimal timing of termination might be.

Dr Penny Roberts presenting to growers on the long-term rotation trial at the Manangatang MSF Mallee Research Update, March 2026.
Photo: Mallee Sustainable Farming.

The Millewa long-term rotation trial, August 2025.
Photo: Mallee Sustainable Farming.

Learn more about the project

A Year 1 project fact sheet outlining the long-term rotation trial is now available. This factsheet focuses on crop performance from the 2025 season. As the project progresses, future updates will build on this to include rotation effects on soil fertility, ground cover and economic outcomes.

Growers can access the fact sheet and follow project updates via the MSF website: https://msfp.org.au/projects/legume-based-cropping-systems

Acknowledgements

The Legume-Based Cropping Systems project is supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

MSF thanks the Hunt family for hosting the long-term trial, and local growers and agronomists for providing input into trial development.

Australian Government | MALLEE SUSTAINABLE FARMING | mallee catchment management authority

CENTRE FOR
INVASIVE SPECIES SOLUTIONS

GLOVEBOX GUIDE FOR MANAGING RABBITS

BROWN A, COX T, WISHART J, HARRIS C,
DAY P, KLEINERT H, BURGI A.

pestSMART PUBLICATION

New guide helps Mallee farmers get on top of feral rabbits

By Heidi Kleinert, Centre for Invasive Species Solutions

A practical new resource from the National Feral Rabbit Management Coordination program, hosted by the Centre for Invasive Species Solutions (CISS), is helping land managers across Australia take a more strategic and cost-effective approach to feral rabbit control.

Feral rabbits remain one of Australia's most damaging pest animals, with serious ongoing impacts on agriculture, pasture productivity and native biodiversity. For farming communities like those across the Mallee, keeping rabbit populations in check is a year-round challenge that demands determination, coordination and the right knowledge.

The recently released third edition of the Glovebox Guide for Managing Feral Rabbits aims to help support people working on rabbit programs. The guide is a practical resource designed to sit in the ute, the office or the toolbox, ready when decisions need to be made.

Assess, plan, manage, improve

The guide takes land managers through an 'assess–plan–manage–improve' approach, outlining a clear pathway to achieving long-term rabbit management success. It covers how rabbits live and breed, the full range of control options including biocontrols such as RHDV, monitoring techniques, and how to develop a management plan suited to local conditions.

National Feral Rabbit Management Coordinator with CISS, Heidi Kleinert, says the guide is for anyone dealing with a rabbit problem, whether they're just starting out or looking to maintain and improve progress already made.

"Action is what makes the difference in feral rabbit management. Real progress happens when landholders, community groups, councils and agencies are equipped with the best knowledge and tools so they can coordinate their efforts on the ground."

Knockdown, knockout, mop-up

The guide outlines a staged management process: starting with knockdown to rapidly reduce numbers with baiting, moving to knockout to sustain that reduction with the removal of warrens, and finishing with mop-up actions to prevent reinfestation. This approach is particularly relevant for the Mallee, where rabbit populations can rebound quickly if management efforts drop off.

Craig Magnussen of the Darling Downs-Moreton Rabbit Board, a funding partner for the guide, puts it plainly: "Rabbit control can be hard. There are no silver bullets and there is no one size fits all, but it's always possible. This guide helps land managers choose the right control option for their situation, to ensure they get the best control outcome for their effort and investment."

The Centre for Invasive Species Solutions gratefully acknowledges the support and funding for this publication through the Australian Government Department of Agriculture, Fisheries and Forestry, NSW Department of Primary Industries and Regional Development, Darling Downs-Moreton Rabbit Board and Foundation for Rabbit-Free Australia.

Order your free copy

Visit PestSmart to download a free digital copy or to order a free hard copy. Bulk orders can also be arranged by using the order form for this and other PestSmart publications.

Find more resources

PestSmart European rabbit management toolkit
https://pestsmart.org.au/toolkits/european-rabbits/

RabbitScan: a FeralScan citizen surveillance digital asset
https://feralscan.org.au/rabbitscan

Rabbit R&D Webinar 2026 playlist
https://www.youtube.com/@PestSmart

CENTRE FOR INVASIVE SPECIES SOLUTIONS

National Feral Rabbit Management Coordinator

Building drought resilience in the Mallee – RDRP program wrap-up

By Jack Roney, Mallee CMA

Photo: Mallee CMA.

Drought is nothing new in the Mallee, but being better prepared for the next one is something the region continues to work towards.

The Mallee Drought Resilience Plan was developed in 2024 as a community-led roadmap for building stronger, more prepared farming systems, landscapes, and communities. The plan brought together input from farmers, industry, community groups, Traditional Owners, and government, identifying practical actions to help the region manage future dry seasonal conditions and droughts.

Over the past 18 months, the first round of work putting the Mallee plan into action has been delivered through the Regional Drought Resilience Planning (RDRP) Implementation Grants program.

Coordinated by Mallee CMA, and guided by a regional Governance Group, the program supported a series of projects designed to deliver those ideas on the ground, with a focus on practical outcomes that address local priorities.

What was delivered

Delivery was supported by a regional Governance Group, made up of representatives from a wide range of organisations across agriculture, community services, water, government, and Traditional Owner groups. The group worked together to identify priorities from the plan, shape the program, and guide delivery.

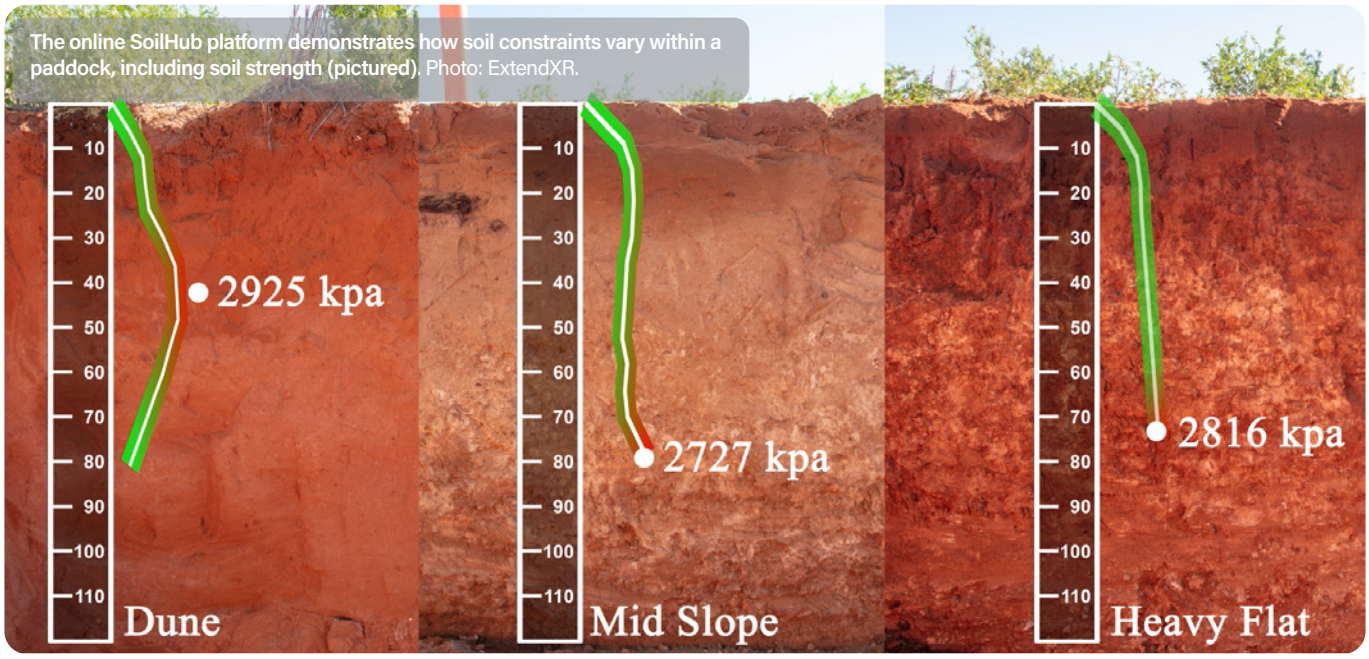
Across the program, projects looked very different depending on the issue they were addressing, but they all had a focus on practical outcomes. Activities covered a range of themes including farming, soil health, business planning, collaboration, culture, and community wellbeing - reflecting the different challenges faced across the Mallee.

Projects were designed to be practical and relevant, delivered by local delivery partners who understand the Mallee. This means the resources developed will continue to be used and built on over time.

Project Snapshot

The program delivered a range of projects across the Mallee, including:

- **Mallee Looper monitoring and research** – building understanding of environmental risks through community and scientific collaboration
- **Pulse agronomy resources** – practical online tools and videos to support decision-making in tough seasons
- **SoilsConnect information hub** – easier access to locally relevant soil and drought information
- **Farm business resilience modelling** – helping farmers better understand financial risk and variability
- **Mallee Mates Working Dog School** – combining hands-on training with wellbeing and social connection
- **SoilHub expansion** – paddock-scale soil insights through interactive tools and field days
- **Belar Native Nursery upgrade** – improving water efficiency and capacity for revegetation and drought recovery



The online SoilHub platform demonstrates how soil constraints vary within a paddock, including soil strength (pictured). Photo: ExtendXR.

New online resources for farmers
Several farming projects were delivered to provide growers with new resources and tools to support decision making and resilience to poor seasonal conditions.

SoilsConnect:
A dedicated Victorian Mallee hub has been developed within the SoilsConnect platform, bringing together region-specific information on soil constraints, fertility, and management. New fact sheets, case studies and podcasts make it easier to find relevant information in one place.

Scan to explore the SoilsConnect hub
https://soilsconnect.com.au/

Pulse agronomy resources:
A series of short videos and online tools have been developed to support pulse growers, with a focus on lentils. These cover key decisions around sowing, disease management and seasonal risk, helping growers make more informed calls in tough seasons.

Scan to access resources on the Frontier Farming Systems website
https://frontierfarming.com.au/gem/

SoilHub:
SoilHub has been expanded with new paddock-scale tools and interactive content, including virtual soil pits and short videos. This helps explain soil variability within paddocks and supports more targeted management decisions.

Scan to explore the SoilHub platform
https://soilhub.com.au/

Key outcomes for the Mallee
- Better access to practical tools and information to support decision-making
- Increased capacity to manage climate variability and risk
- Stronger connections between organisations, communities, and industry
- New knowledge around soils, business risk and emerging issues
- Investment in infrastructure and resources that will keep delivering benefits into the future

Going forward
While this phase of the program has wrapped up, the work doesn't stop there.

The tools, resources and information will keep being used and built on, the online platforms will continue to be updated, and the connections formed between organisations and farming networks will carry on into future work.

This was a first step under the Mallee Drought Resilience Plan, which continues to guide what comes next.

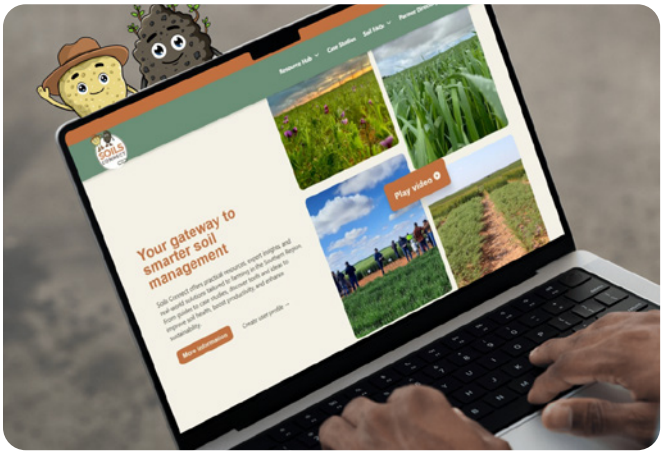
Acknowledgements
This program of the Regional Drought Resilience Planning program is supported by Mallee CMA, through funding from the Australian Government's Future Drought Fund and the Victorian Government.

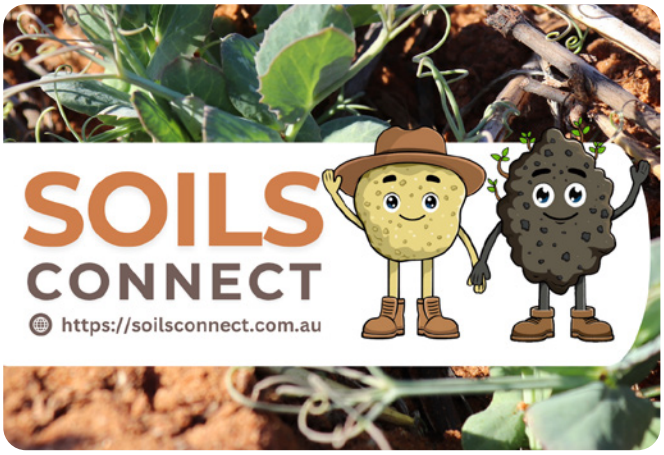
A big thank you goes to all delivery partners, Governance Group members, farmers and community members who got involved and helped make the program a success.

Australian Government
Department of Agriculture, Fisheries and Forestry
Future Drought Fund
AGRICULTURE VICTORIA
mallee catchment management authority

Soils Connect delivers practical support for Victorian Mallee growers

By Sarah Day, Mallee Sustainable Farming





Access to practical and locally relevant information is critical for farming successfully in the Victorian Mallee, where seasonal variability, soil constraints and drought pressures continue to challenge production systems.

To support growers and advisors, Mallee Sustainable Farming (MSF), with support from the Mallee Catchment Management Authority (Mallee CMA) through the Regional Drought Resilience Planning Program, expanded the Soils Connect platform to deliver region-specific soil and drought resilience resources.

The project focused on improving access to practical research, fact sheets, case studies, podcasts and decision-making tools relevant to low rainfall farming systems.

Consultation with Victorian Mallee growers highlighted strong demand for local trial information, with nearly 80 per cent of respondents preferring regionally relevant research and case studies.

Key challenges identified included:

- Compaction and hard-setting soils
- Mallee seeps and dry saline land
- Non-wetting sandy soils
- Declining fertility in continuous cropping systems
- Soil testing and lime management decisions

These priorities directly shaped the development of new Soils Connect resources.

New Victorian Mallee-focused content added to the platform includes:

- Fact sheets on sandy soils, soil amelioration and diagnosing constraints
- Guidance on balancing erosion risk and early sowing
- Nitrogen and crop rotation trial learnings
- Soil pit case studies from Walpeup and Kooloonong
- Podcasts on mallee seeps and saline land management

The project also improved the structure and accessibility of the Soils Connect website through the development of state-based resource hubs and a dedicated media library for podcasts, fact sheets, videos and case studies. Resources were promoted through MSF Mallee Research Updates and pre-seeding workshops across Victoria and the broader tri-state Mallee region, reinforcing the value of combining face-to-face extension with digital delivery.

Feedback from growers at MSF events highlighted strong interest in topics including nitrogen management, wind erosion, carbon farming awareness, sandy soil constraints and dry saline land management.

Soils Connect continues to grow as a practical knowledge hub supporting more informed soil and land management decisions across the Southern Region.

The platform also features interactive tools such as the Mallee Seeps Decision Tree and Dry Saline Land Decision Tree, helping growers work through management decisions using practical, step-by-step guidance.

For more information and to explore the latest resources, visit the Soils Connect website (www.soilsconnect.com.au) or the VIC Resource Hub (www.soilsconnect.com.au/sc_region/victoria/).

Acknowledgement
This project of the Regional Drought Resilience Planning program received funding from the Australian Government's Future Drought Fund and the Victorian Government.

Australian Government Department of Agriculture, Fisheries and Forestry | Future Drought Fund

AGRICULTURE VICTORIA | MALLEE SUSTAINABLE FARMING

Impact of high fuel and fertiliser prices on farm profitability

By Kent Wooding, Ag Insights Consulting

Rising input costs have been front of mind for Mallee farmers over the past few seasons, but how much are they actually affecting farm profitability?

Two model farm case studies from the northern and southern Mallee help answer that question, using simulation modelling to examine the full range of financial outcomes.

Northern vs Southern Mallee focus model farms
These case studies use simulation modelling of two representative Mallee farming systems (northern and southern) to assess how whole-farm operational profitability responds to seasonal variability, commodity prices, and increasing input costs.

Rather than relying on average outcomes, the modelling highlights the full range and likelihood of financial results under different scenarios.

Across both farms, the results show that profitability is highly variable and increasingly influenced by costs and external pressures. While there are differences between systems, particularly in relation to specific input costs, the overall findings point to a narrowing of high-profit outcomes and an increased likelihood of losses when the risks align. The probability of achieving moderate profits remains relatively stable across scenarios, reinforcing the need to manage downside risk as a core part of business management.

The analysis compared two model broadacre farming systems. One in the Northern Mallee (4000ha) and one in the Southern Mallee (3000ha) under a range of fuel and urea price scenarios. Other variables were grain price and yield using historical decile modelling.

The effect of high fuel and fertiliser price was assessed using EBITDA (Earnings before Interest, Tax, Depreciation and Amortisation). This removed the impact of farm equity and machinery inventory and closely relates to the true cash costs of the business operations.

Key Findings

1. Both businesses remained operationally profitable in median and favourable seasons

Despite large increases in fuel and fertiliser prices, both farming systems still generated positive median EBITDA outcomes.

- Northern Mallee median EBITDA fell from approximately $668,000 under the base scenario to $334,000 under combined high fuel and high urea pricing.
- Southern Mallee median EBITDA declined from approximately $957,000 to $569,000 under the same scenario.

This demonstrates that although input price shocks significantly reduce profitability, well-structured broadacre systems can remain financially viable in average seasons.

2. The Southern Mallee system demonstrated greater resilience

The Southern Mallee farm consistently produced:
- Higher median EBITDA
- Lower downside risk

For example:
- Under the base scenario, the Southern Mallee business achieved EBITDA greater than $1 million in almost 49% of years, compared with 40% in the Northern Mallee.
- Under the combined high fuel and high urea scenario, the Northern Mallee had a 12.2% chance of EBITDA falling below negative $1 million, compared with 5.2% in the Southern Mallee.

This reflects the greater production reliability and yield potential typically associated with the Southern Mallee environment.

3. Fertiliser price increases had a larger impact than fuel

Across both regions, high urea prices had a greater negative impact on EBITDA than fuel alone.

This highlights:

- The significant dependence of modern broadacre systems on nitrogen fertiliser
- The sensitivity of farm profitability to global fertiliser markets
- The importance of nitrogen efficiency and strategic fertiliser decision making

In both case studies, the "High Urea" scenario reduced profitability more sharply than the "High Fuel" scenario.

4. Risk increases when both fuel and fertiliser prices rise together

The combined "High Fuel + High Urea" scenario created a significant increase in downside financial risk.
The probability of achieving EBITDA above $1 million reduced materially:

- Northern Mallee: from 40.0% to 31.6%
- Southern Mallee: from 48.9% to 36.6%

At the same time, the proportion of low or negative EBITDA years increased substantially.
This reinforces how multiple cost shocks occurring simultaneously can rapidly compress farm margins and business resilience.

Table 1. Scenario Comparisons

	Fuel Price ($/L)	Urea Price ($/t)
Base Scenario	1.8	765
High Fuel	3.20	765
High Urea	1.80	1400
High Fuel + High Urea	3.20	1400

Table 2. How risk changes with higher input costs

Scenario	Chance of large losses (< -$1M)	Chance of moderate profit ($0-$1M)	Chance of high profit (> $1M)
Northern – Base	5.5%	31%	40%
Northern – High Fuel + Urea	12.2%	28%	31.6%
Southern – Base	1.6%	32%	48.9%
Southern – High Fuel + Urea	5.2%	32%	36.6%

Table 2 shows how the likelihood of different profit outcomes shifts as fuel and fertiliser prices increase.

Across both farms, higher input costs reduce the chance of strong profit years (above $1 million) and increase the likelihood of losses, particularly when fuel and fertiliser prices rise together.

Importantly, the chance of achieving moderate profits (between $0 and $1 million) remains relatively stable. This highlights that the biggest impact of rising costs is not just lower average returns, but greater exposure to poor years and reduced upside.

Table 3. Median profitability impact (EBITDA)

Scenario	Northern Mallee	Southern Mallee
Base	$668k	$957k
High Fuel + Urea	$334k	$569k

Table 3 compares the change in median (typical) profitability under higher input costs. Both farms remain profitable in a median season, but the reduction in EBITDA is significant. This highlights that while well-structured businesses can absorb higher costs in average years, overall profitability is still heavily impacted.

The results also reinforce the stronger underlying performance of the Southern Mallee system, driven by more reliable production conditions.

Take Home Messages

1. EBITDA is a useful benchmarking tool. Using EBITDA allowed comparison of the operational strength of different farm businesses without distortion from debt structure or machinery ownership. It provides a clearer understanding of true business risk and operating resilience.

2. Input cost volatility is a major business risk. Fertiliser and fuel price spikes can substantially reduce operational profitability, even in well-managed businesses. Strategic purchasing, nitrogen efficiency and cost control are becoming increasingly important.

3. Production reliability matters. The Southern Mallee system demonstrated that more reliable production environments provide stronger protection against input price shocks. Yield stability remains one of the strongest drivers of long-term business resilience.

4. Strong seasons still create substantial opportunity. Even under elevated input costs, both systems retained strong upside potential in favourable seasons, highlighting the importance of maintaining operational capacity and agronomic performance rather than simply cutting inputs aggressively.

5. Risk management is critical. The modelling highlights the need for:

- Honest cash flow planning
- Working capital buffers
- Flexible fertiliser strategies
- Scenario planning
- Careful machinery and debt management

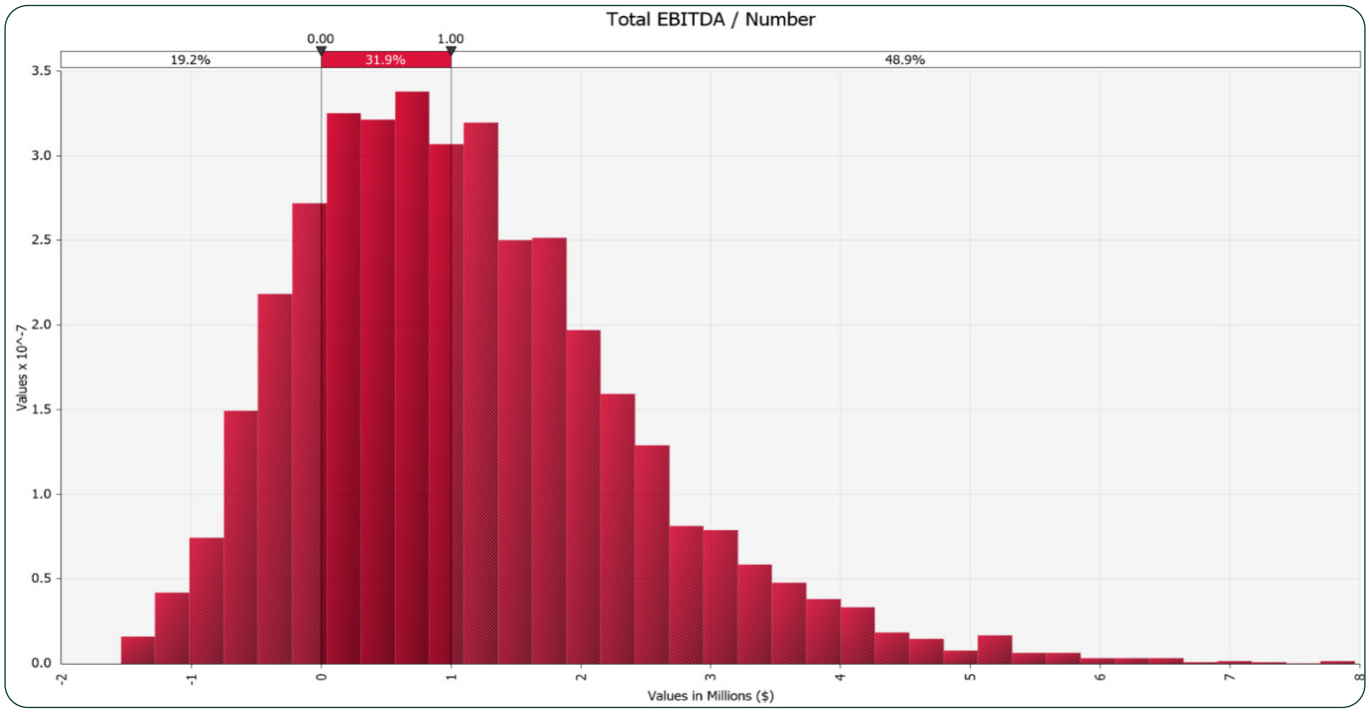


Figure 1: Southern Mallee Focus Farm EBITDA Distribution: Base Farm Scenario. A range of outcomes is possible in a typical season, with strong upside potential and relatively low risk of large losses.

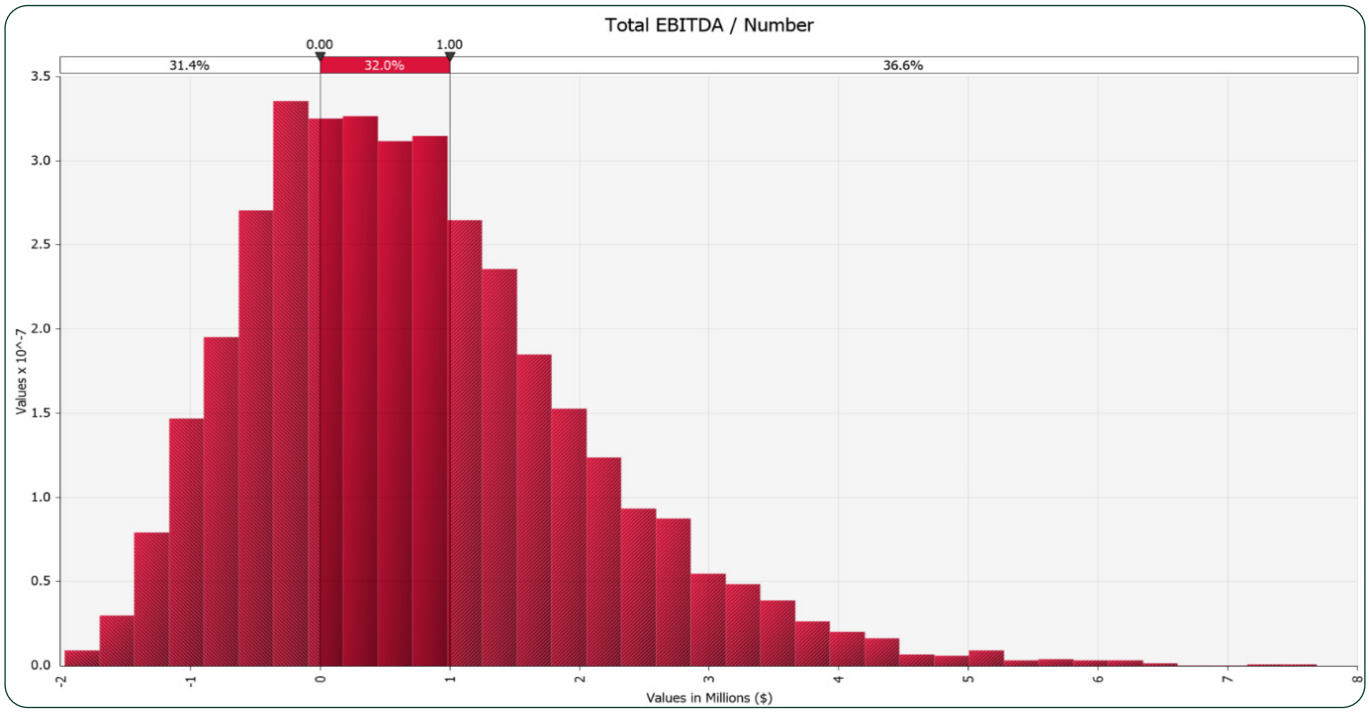


Figure 2: Southern Mallee Focus Farm EBITDA Distribution: High Fuel + High Urea Scenario. Higher input costs shift the distribution, reducing the likelihood of high-profit years and increasing exposure to losses in poor seasons.

The businesses most likely to remain resilient will be those that can adapt quickly to changing cost structures while maintaining production efficiency.

These findings support the importance of combining strong agronomy with disciplined business management when navigating periods of high input cost volatility in Australian broadacre farming systems.

For more information, please contact:
Kent Wooding, Ag Insights Consulting
Email: kent.wooding@aginsightsconsulting.com

Acknowledgement
This project of the Regional Drought Resilience Planning program received funding from the Australian Government's Future Drought Fund and the Victorian Government.

How to diagnose subsoil constraints in Mallee soils

By Jay Cummins, Mallee Sustainable Farming

Photo: Mallee Sustainable Farming.

This article provides a summary of a detailed fact sheet on diagnosing subsoil constraints in Mallee soils, available through the Soils Connect website.

Poor crop performance in Mallee paddocks often results from various soil constraints. Sandy rises, calcareous soils, red-brown earths, shallow soils over calcrete, and heavier subsoil layers each present unique challenges to crop establishment, root growth, water use, and nutrient uptake. Common problems include water repellence, low fertility, compaction, high soil strength, alkalinity, salinity, sodicity, boron toxicity, chloride toxicity, subsoil carbonate, and erosion risk.

The first step is to identify the main constraint in the target zone of the paddock before selecting a treatment. This is important because the most effective response depends on whether the issue is physical, chemical, nutritional, or a combination of these.

Start by identifying the target zone

Begin by inspecting the area of the paddock that isn't doing well. This might be a sandy hill, a patch with poor growth, an area that dries out too soon, a saline or bare patch, a traffic-compacted zone, or a soil type that doesn't respond well to fertiliser. Use paddock history, grower observations, yield maps, NDVI imagery, EM38

maps, soil type maps, and visual crop performance to split the paddock into practical diagnostic zones.

Always compare a poorly performing zone with a nearby zone that performs better. This helps identify whether the issue stems from soil type, landscape position, traffic history, nutrient levels, water-holding capacity, or subsoil chemistry.

Soil pit and root inspection
A soil pit is a very useful diagnostic tool. Dig a small pit or expose a clear soil face in both the poor-performing and better-performing zones. Record the soil layers, colour differences, texture variations, rooting depth, hard pans, carbonate or calcrete layers, clay bands, and any signs of waterlogging, salinity, or poor structure.

Examine the roots carefully. If roots are shallow, grow sideways, become thickened, distorted, or stop abruptly at a certain depth, this shows that something is restricting root growth.

Water repellence: conduct a water drop test
Water repellence is usually strongest in the dry surface soil, especially in the top 0-5 cm of sandy soils. Collect dry topsoil from the target area and place it on a flat surface or in a shallow dish. Carefully add a few drops of clean water with a dropper, syringe, or small spoon. Watch to see if the water soaks in quickly or forms beads on the surface.

High soil strength or compaction
High soil strength restricts root growth and limits access to stored soil water and nutrients. Use a penetrometer, push probe, steel rod, or soil pit inspection to identify hard layers.

Soil texture and layer changes
Check soil texture at varying depths using a hand-texture test, soil pit inspection, or laboratory particle-size analysis. Texture affects water retention, nutrient storage, root growth, and the potential effectiveness of soil improvement.

pH, carbonate and nutrient status
Regularly check soil pH and nutrient levels, especially in soils with low fertility, high alkalinity, calcareous characteristics, deep acidity, or where crops respond poorly to fertiliser despite increased application rates.

Salinity, chloride, boron and sodicity
Chemical constraints in the subsoil should be evaluated before investing in large-scale mechanical improvements.
Nutrition, plant tissue testing and fertiliser strips
Use plant tissue testing when crop symptoms are present, but soil test results are unclear. Fertiliser test strips can also help confirm whether nutrient supply limits crop performance.

Mallee seeps, dry saline land and surface salt symptoms
Bare patches, white crusts, poor crop emergence, waterlogging, surface ponding, or repeated crop failure in the same patches should prompt salinity and landscape position assessments. These areas require careful diagnosis before any physical soil disturbance is undertaken.

Interpreting the diagnosis before choosing a treatment
The key question is: what is the main factor limiting root growth, crop establishment, water use, and yield in this zone?

If the main constraint is water repellence, low fertility, shallow compaction, or high soil strength, options such as wetting agents, improved nutrition, seeding system changes, deep ripping, inclusion ripping, spading, delving, or organic amendments may be worth testing. Start with small trial strips and compare treated and untreated areas over more than one season.

If the main constraint is chemical or toxic subsoil conditions, large-scale mechanical improvement becomes much less reliable. Deep ripping or mixing may not solve the issue if roots are penetrating a layer affected by salinity, sodicity, high boron, high chloride, high pH, or carbonate. In these cases, address the soil chemistry problem first where possible, choose tolerant crop or variety options, keep cover, and test any amelioration method on a small scale before expanding.

In Mallee soils, several constraints often occur together. The most reliable decisions come from combining simple paddock checks with laboratory testing by depth. Where hostile chemical subsoil constraints dominate, mechanical disturbance should be approached cautiously and tested in strips before large-scale adoption.

For further information
To view the full version of this fact sheet (including test information and diagrams), visit the Soils Connect website at www.soilsconnect.com.au.

Acknowledgements
This project of the Regional Drought Resilience Planning program is supported by Mallee CMA and Mallee Sustainable Farming, through funding from the Australian Government's Future Drought Fund and the Victorian Government.

Australian Government
Department of Agriculture, Fisheries and Forestry
Future Drought Fund
AGRICULTURE VICTORIA
MALLEE SUSTAINABLE FARMING

We'd love your feedback

Mallee Farmer is a Mallee CMA publication designed specifically for our regional farming community - and we want your input!

We're always looking for ways to ensure our readers are getting the most out of Mallee Farmer, and we do that best via feedback from you.

We invite you to complete a short online survey to share your feedback on this edition and previous issues.

- **What topics do you find most valuable?**
- **What would you like to see more (or less) of?**
- **How can we improve the format, content or delivery?**

Scan the QR code or visit the link below to complete the survey: https://www.surveymonkey.com/r/HC5Z8ZN

mallee catchment management authority

Prefer to contact us directly?
You can also share your feedback, ideas or story suggestions with us at:
Email: reception@malleecma.com.au
Phone: 03 5001 8600

MalleeFarmer

Acknowledgement
This publication is supported by the Australian Government through funding from the Natural Heritage Trust under the Climate-Smart Agriculture Program.

Publisher:
Mallee Catchment Management Authority
ISSN: 1839 - 2229

Design & Artwork by Haynes Design Pty Ltd - info@haynesdesign.com.au