Department of
Primary Industries and
Regional Development

GOVERNMENT OF
WESTERN AUSTRALIA

Protect
Grow
Innovate

DPIRD Broadacre Systems R&D

Stakeholder Update

June 2026 Edition

Contents

How this work supports WA priorities

Every project featured in this update contributes to broader WA Government priorities focused on strengthening the future of agriculture, regional communities and food production.

Cover: DPIRD Agricultural Economist, Sud Kharel, and Research Scientist, Tim Scanlon, record a Grains Convo episode exploring nitrogen decisions under changing fertiliser prices.

Acknowledgment of Country

The Department of Primary Industries and Regional Development (DPIRD) acknowledges the Traditional Custodians of Country, the Aboriginal people of the many lands that we work on and their language groups throughout Western Australia (WA) and recognise their continuing connection to the land and waters. We respect their continuing culture and the contribution they make to the life of our regions, and we pay our respects to their Elders past, present and emerging.

Department of Primary Industries and Regional Development

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From Broadacre Systems Executive Director, Kaara Klepper

Dr Kaara Klepper, Broadacre Systems (DPIRD)

Welcome to the latest edition of the Broadacre Systems R&D Stakeholder Update.

The first half of 2026 has reinforced the pace and scale of change facing Western Australian agriculture. Seasonal variability, elevated input costs and ongoing global uncertainty are placing sustained pressure on margins and increasing the complexity of operational decision making.

Across this update, the implications are clear. Whether through more responsive nitrogen strategies, improved climate and agronomic decision tools, or advances in soil and disease management, the priority is consistent enabling more informed, risk-aware decisions at the farm level.

In this context, we have implemented a new organisational structure for Broadacre Systems.

This is a targeted, deliberate change. It aligns capability with the areas of greatest strategic importance and strengthens accountability for delivery. By bringing together complementary expertise across crop, soil and systems innovation, and embedding stronger leadership oversight, we are better positioned to direct investment, accelerate outcomes and maximise impact for industry.

The rationale is straightforward. The challenges shaping agriculture are increasingly interconnected: productivity, input efficiency, soil performance, biosecurity risk, climate resilience and technology adoption must be addressed as a system. Our structure reflects this reality and is designed to ensure our work delivers integrated, practical solutions rather than disconnected outputs.

This approach builds on a strong foundation. WA's agricultural performance has been underpinned by long term investment in research and innovation that translates into measurable gains in productivity, resilience and competitiveness.

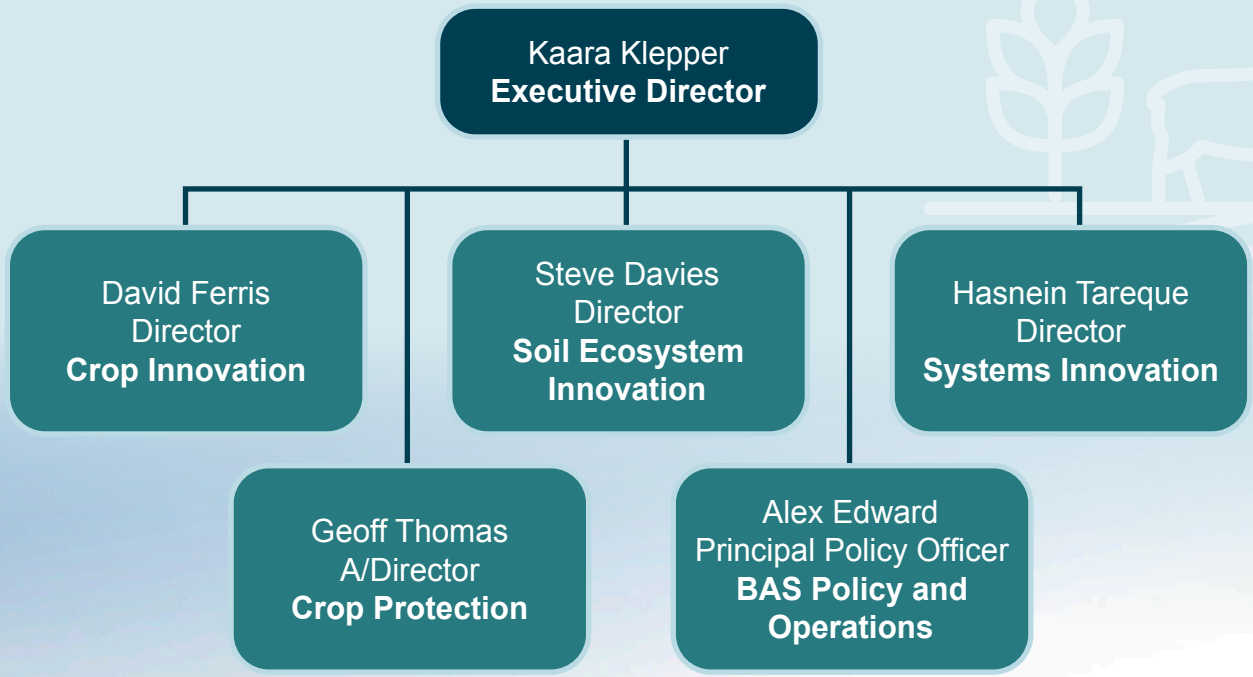
Maintaining that trajectory requires continued focus, coordination and disciplined prioritisation.

Our structure is designed to do exactly that – strengthen the link between research and application, focus effort where it will deliver the greatest return, and support industry through both current pressures and future opportunities.

The structure includes the appointment of Dr David Ferris as Director Crop Innovation, Dr Stephen Davies as Director Soil Ecosystem Innovation and Dr Hasnein Tareque as Director Systems Innovation. Geoff Thomas continues as Acting Director Crop Protection while recruitment progresses, and Alex Edward leads the Policy and Operations function.

We are focused on delivering outcomes that matter, supporting better decisions, improving system performance and strengthening the long term resilience and competitiveness of WA agriculture.

BAS Structure:



Dr Kaara Klepper
Executive Director, Broadacre Systems

Grains Convo is back and it's arriving right when you need it most

We've relaunched the Grains Convo podcast to bring you straight talking, practical insights to help you navigate the 2026 season. No ads, no long reads, just the conversations that matter, when they matter.

Each episode draws on DPIRD's research and on ground expertise to share insights and practical tools relevant to the season ahead. It's about connecting our R&D with real world application and supporting informed decisions as conditions evolve.

You can listen wherever it suits you:

LISTEN ON Spotify

Listen on Apple Podcasts

If you would like to stay across the conversation this season, we would love to have you along. Hit the subscribe button below to receive:

- Notifications when new episodes are released, and
- Links to the tools and resources mentioned in each episode.

Subscribe now:

Grains Convo

Smarter nitrogen decisions for the season ahead

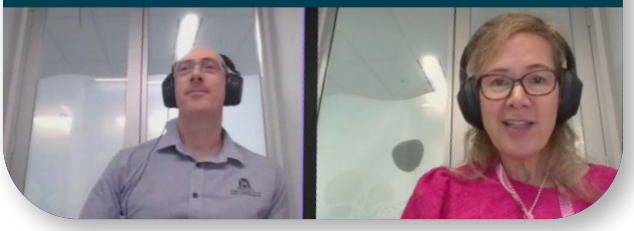
Dr Dion Nicol discusses practical nitrogen strategies to improve returns and make confident in-season decisions.

Listen to this episode:

Maximising canola returns with less

Jackie Bucat discusses managing canola under tight seasonal and input constraints to support sound decision making.

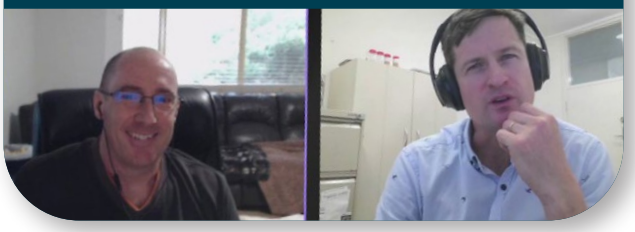
Listen to this episode:



Deep ripping: what it costs and what it returns

Wayne Parker explains how the EasyDiesel Calculator can help growers assess the financial return of deep ripping before investing.

Listen to this episode:



Getting more from legumes in your rotation

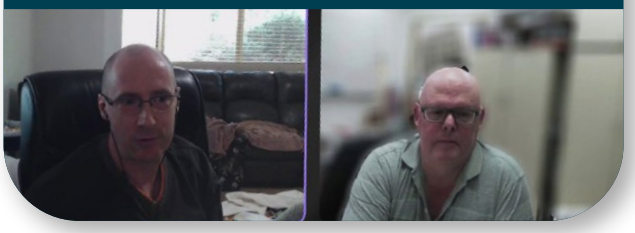
Mark Seymour discusses pulse crop decisions that can reduce risk, improve soil health and maximise returns.

Listen to this episode:

Getting ahead with lupins

Greg Shea discusses practical lupin management strategies to maximise nitrogen benefits and support stronger returnsg.

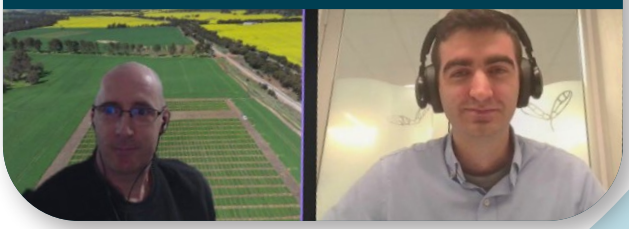
Listen to this episode:



Balancing yield and profit this season

Nick Thorsager discusses how growers can adjust inputs to maximise economic returns, balance risk and reward, and make more confident decisions in challenging seasons.

Listen to this episode:



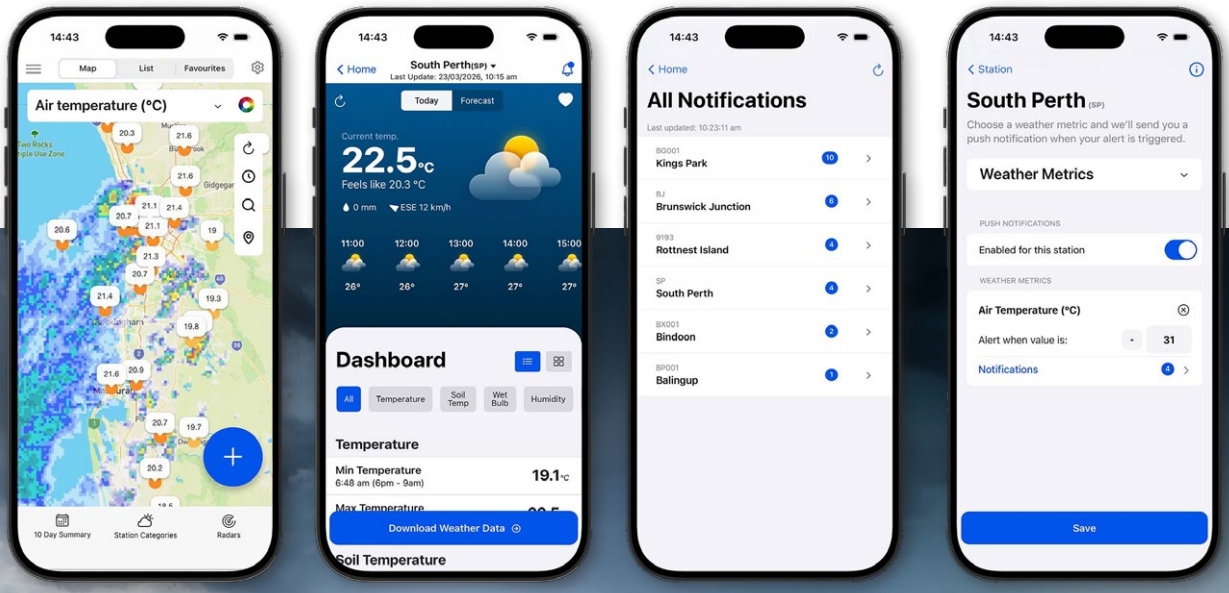
Supports WA Government priority:
AgTech and digital innovation

DPIRD's new Weather app puts paddock-ready intelligence in growers' pockets

WA growers now have a faster and more practical way to monitor weather conditions, with DPIRD launching a major upgrade of its Weather app ahead of the growing season.

Unlike standard weather apps that provide broad regional forecasts, the DPIRD Weather app delivers real time data direct from more than 191 weather stations across Western Australia, giving growers highly localised information they can use immediately in the paddock.

The upgraded app brings together live rainfall, temperature, humidity, wind, soil temperature and radar in one easy-to-use mobile platform, helping users make quicker and more confident decisions around spraying, sowing and harvest timing.



New features include interactive radar playback, custom weather alerts, downloadable historical data and personalised dashboards synced across devices.

Growers can now receive alerts when frost, heat or spraying thresholds are reached, monitor changing conditions in real time and quickly compare weather across locations.

The app also allows users to access detailed station dashboards previously only available on the DPIRD Weather website, including evapotranspiration and spraying condition data.

DPIRD data science and platforms weather station operations manager Dr Stephen Bradshaw said the upgrade was focused on turning trusted weather data into practical tools for industry.

“This app puts reliable, location-specific weather intelligence directly into the hands of the people who need it most,” Dr Bradshaw said.

“The benefit for growers is immediate because they can act sooner, reduce risk and make more informed operational decisions using a single trusted source.”

The upgraded DPIRD Weather app is now available on Apple and Android devices and highlights how DPIRD is using digital innovation to support productivity, resilience and smarter decision making across WA agriculture.

For more information on the app, the Weather Stations online resource and more climate tools:

Weather stations and radar

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Supports WA Government priority:
Research investment and innovation

New insights into nitrogen decisions under higher urea prices

With urea prices reaching around $1,300 per tonne, DPIRD economists have examined how higher fertiliser costs are influencing the profitability of common crop rotations and nitrogen application strategies across Western Australia.

DPIRD's Industry Economic Analysis team examined how higher urea prices affect the profitability of common dryland crop rotations across Western Australia. DPIRD's Industry Economic Analysis team compared gross margins of common rotations on two soil types at Merredin, Wongan Hills and Katanning.

Two nitrogen application strategies were assessed. The first applied nitrogen at a fixed proportion of expected yield regardless of fertiliser price. The second adjusted nitrogen application rates according to the relationship between fertiliser and grain prices. Four urea price scenarios were examined, ranging from $600 to $1,500 per tonne.

Rotations that included canola consistently returned the highest gross margins under lower nitrogen price scenarios. However, legume-based rotations were more resilient as fertiliser prices increased. At Wongan Hills, for example, a wheat wheat lupin rotation experienced a smaller decline in gross margin than a wheat wheat canola rotation as nitrogen prices rose. Biological nitrogen fixation in the lupin phase reduced reliance on purchased nitrogen fertiliser.

The analysis also found fixed ratio strategies generally resulted in higher nitrogen application rates and a greater upfront commitment to fertiliser before seasonal conditions were fully known.

DPIRD economist Sud Kharel said the findings highlighted how changes in fertiliser prices can influence the profitability of different nitrogen management strategies.

"As nitrogen prices increase, the economics of nitrogen application can change considerably," Sud said.

“At higher nitrogen prices, the risk of locking in higher input costs can begin to outweigh the potential seasonal upside, making more responsive nitrogen strategies increasingly valuable.”

At Katanning, the Economic Target strategy delivered gross margins around $40 per hectare higher than the Fixed Ratio strategy in a wheat wheat canola rotation under higher nitrogen price scenarios.

While gross margin analysis provides useful insights, the researchers note that enterprise decisions should also consider broader whole farm factors, including fixed costs, risk and business objectives.

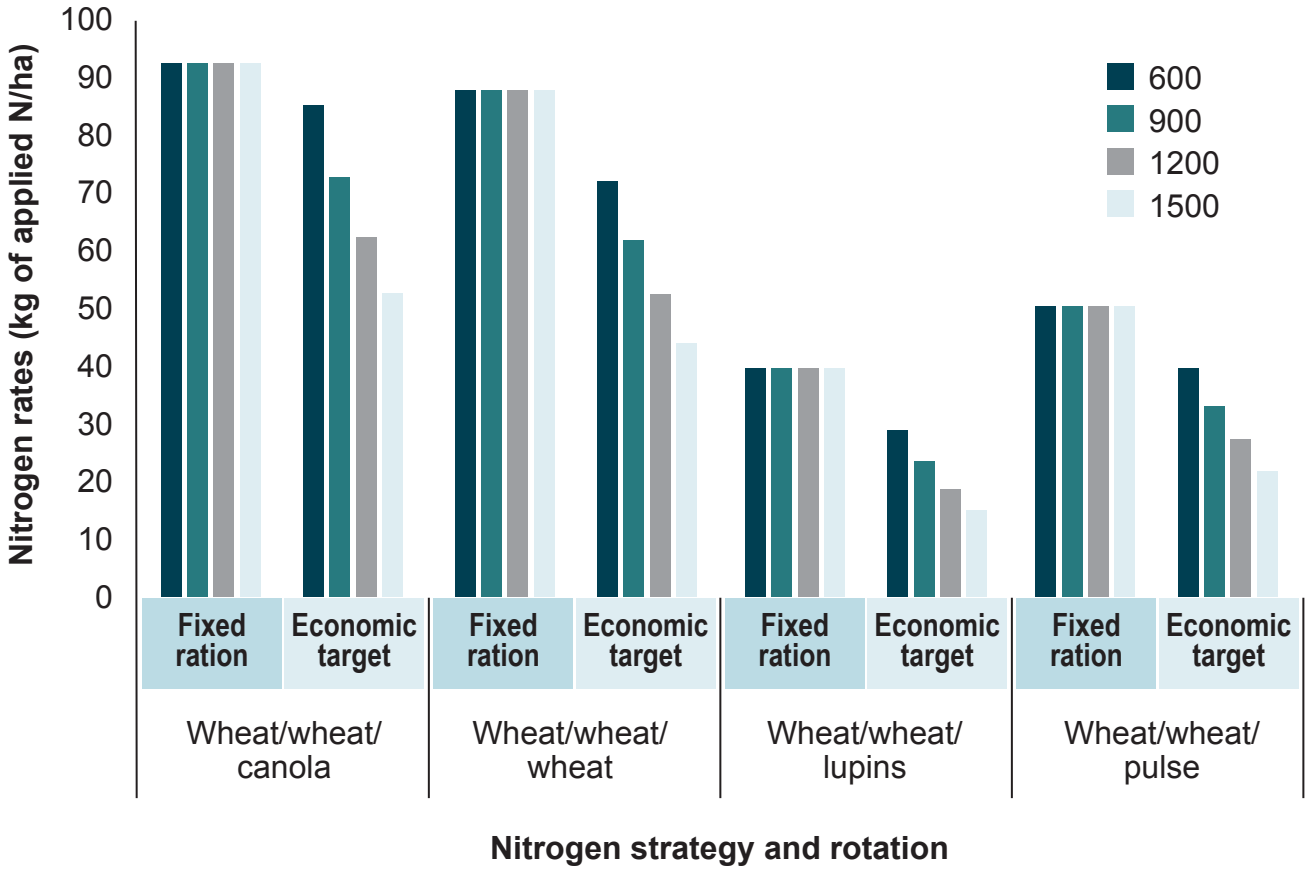

Figure 1. *Nitrogen application rates for different rotations and nitrogen application strategies under varying urea price scenarios on a deep sandy soil at Wongan Hills.*

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Supports WA Government priority:
AgTech and digital innovation

FlowerPower update delivers sharper flowering predictions for WA growers this season

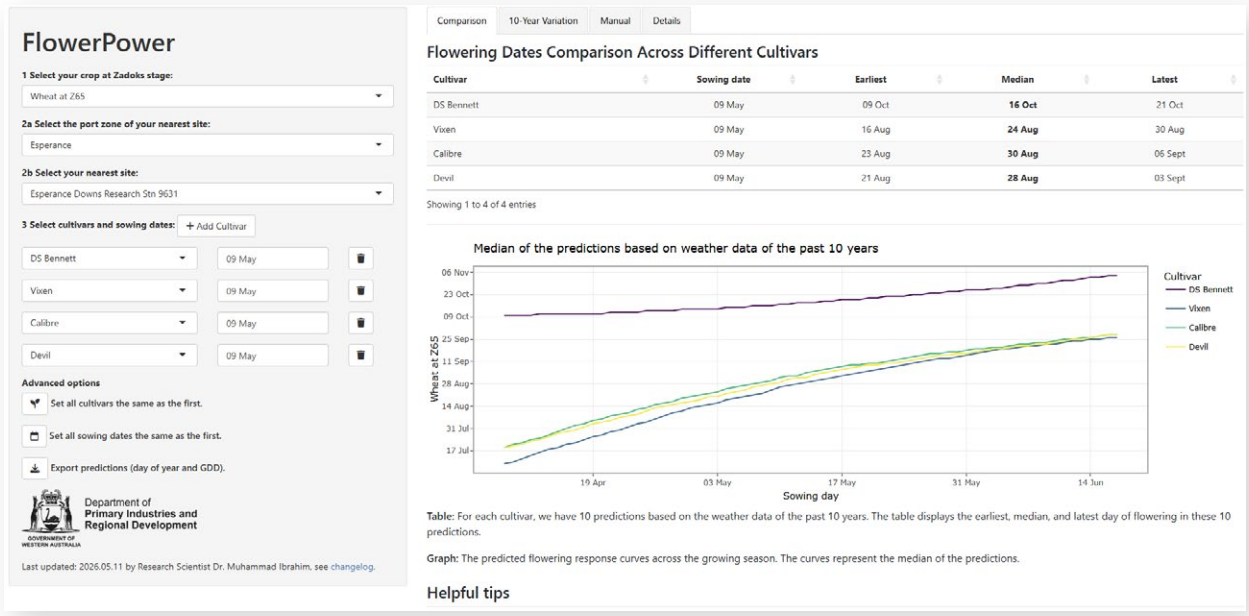
WA grain growers are gaining more accurate flowering predictions this season through major improvements to DPIRD's FlowerPower app.

The updated web based decision support tool is helping growers and advisers make more confident variety and sowing decisions to better manage frost, heat and seasonal variability.

FlowerPower allows users to enter their location, cultivar and sowing date to receive a predicted flowering date, alongside the historical flowering range based on the past 10 years of seasonal weather.

The tool is built on a DPIRD developed phenology model that combines temperature, photoperiod and vernalisation to predict crop development across wheat, barley and oats.

The latest 2026 release strengthens the wheat module using new trial data collected from DPIRD research sites at Mullewa, Katanning and Mt Burdett, combined with a decade of weather records.



The update also includes agronomic refinements led by DPIRD agronomist Brenda Shackley to improve prediction accuracy for newer cultivars and correct inconsistencies identified at specific sites.

Around 14 per cent of wheat predictions across the dataset were refined as part of the update, improving the reliability of flowering estimates for growers planning this year's sowing program.

The app helps growers better target the optimal flowering window, reducing exposure to spring frost early in the season and heat or moisture stress later in spring.

DPIRD Research Scientist Dr Muhammad Ibrahim said the improvements combined advanced modelling with practical agronomic expertise to deliver more reliable seasonal guidance for industry.

"FlowerPower gives growers and advisers a practical way to compare seasonal scenarios and make more informed decisions before and during sowing," Dr Ibrahim said.

The FlowerPower app continues to be updated annually using new trial data and feedback from growers and agronomists.

FlowerPower app

Supports WA Government priority:
AgTech and digital innovation

New EasyDiesel Calculator helps growers target profitable deep ripping opportunities

WA grain growers are using a new DPIRD tool to weigh up whether deep ripping stacks up financially in a season where every fuel and fertiliser decision matters.

The EasyDiesel Calculator allows growers to compare fuel price, grain price and expected yield response scenarios to assess whether deep ripping is likely to deliver a return.

DPIRD Principal Research Scientist Wayne Parker said the calculator helped growers target paddocks where deep ripping was most likely to improve profitability.

“Deep ripping can improve water use efficiency and increase nitrogen uptake by allowing roots to access stored moisture and nutrients deeper in the soil profile,” Mr Parker said.

DPIRD principal research scientist Wayne Parker has encouraged grain growers to use the EasyDiesel calculator to inform deep ripping decisions.

Recent rainfall across parts of the grainbelt has created favourable soil conditions for deep ripping to depths of 450 to 550 millimetres to break compacted layers and improve root growth.

DPIRD research has shown nitrogen uptake efficiency can increase by an average of 65 per cent in deep ripped soils compared to unripped conditions.

The EasyDiesel Calculator was developed by the Department of Primary Industries and Regional Development with co-investment from the Grains Research and Development Corporation through the Soil Water and Nutrition strategic collaboration.

ABOVE: DPIRD principal research scientist Wayne Parker assessing subsoil structure and root growth in the field.

Link/s to more information or resources:

- **To learn more about the EasyDiesel calculator and deep ripping to access soil nitrogen listen to the DPIRD's Grains Convo podcast, available on Spotify and iTunes or the Department website.**

Grains Convo

- **The free EasyDiesel Calculator is available on:**

SoilsWest Soil Quality Knowledgebase webpage

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Supports WA Government priority:
Climate resilient food production

DPIRD soil breakthrough lays foundation for the next generation of soil amelioration

DPIRD researchers are reshaping the way the grains industry thinks about soil constraints, with groundbreaking new research showing how integrated soil re-engineering could unlock long-term productivity gains for WA growers.

A newly published paper led by DPIRD principal research scientist Dr Gaus Azam tested a novel approach that reconstructs the soil profile to 80 centimetres depth using physical and chemical amendments in a single intervention.

While growers already use practices such as deep ripping, liming and claying, the research is the first to scientifically demonstrate the long-term benefits of combining multiple soil amelioration strategies into a complete “soil profile re-engineering” system.

LEFT: Chad Reynolds and Jo Walker with a deep spader. RIGHT: Dr Gaus Azam and Bolgart grower Trevor Syme establishing new soil reengineering trials at Mt Horner and Wagin.

Rather than treating acidity, compaction and poor soil structure separately, the approach tackled multiple constraints at once to create healthier and more resilient growing conditions for crops.

The four-year WA study delivered major and lasting improvements across contrasting grain-growing soils.

Key findings included:

- Subsoil constraints that restrict root growth were rapidly alleviated and remained below critical thresholds for at least four years.
- Subsoil pH increased by 1.5–1.7 units, far exceeding improvements typically achieved through surface liming.
- Soil water storage increased by up to 25 millimetres, helping crops access more moisture during dry conditions, especially at the grain filling stage.
- Improvements in soil structure, carbon and nutrient holding capacity were maintained across seasons and are projected to last for several more years.

The research provides an important scientific foundation for future machinery and farming systems capable of transforming how constrained soils are managed across WA grain-growing regions.

Read the full article:

Soil re-engineering in Western Australia

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Northam based SWAN Program 1 team and Liebe Group researchers, at the new Soil Reengineering trial at Nixon property near Kalannie.

Supports WA Government priority:
Research collaboration and industry engagement

DPIRD sharpens focus on hidden soilborne disease threats

The grains industry has spent decades fighting diseases above ground. DPIRD researchers are now sharpening the focus below it.

ABOVE: Dr Daniel Hüberli is leading research to better manage soilborne diseases affecting WA grain production.

Senior Research Scientist Dr Daniel Hüberli is leading WA field research under a major national initiative tackling some of the grains industry's most stubborn and costly soilborne diseases.

The five-year Soil-Borne Disease Initiative brings together leading researchers from across Australia to target diseases estimated to cost grain growers more than $1.7 billion annually.

Backed by a $20 million investment from the Grains Research and Development Corporation, the initiative is combining paddock trials, diagnostics and farming systems research to give growers a stronger edge against hidden disease threats.

DPIRD's role focuses on integrated disease management under WA conditions, targeting major threats including rhizoctonia root rot, fusarium crown rot, sclerotinia and root lesion nematodes.

Dr Hüberli said the project would help growers better understand disease risk and support more informed management decisions throughout the season.

"Managing soilborne diseases is becoming increasingly complex for growers, particularly as seasonal conditions and farming systems continue to change," Dr Hüberli said.

“This initiative brings together expertise from across the country to develop practical solutions that can help growers reduce losses and improve long-term productivity.”

The DPIRD team will integrate field trials, diagnostics and farming systems research to improve disease risk assessment and support more targeted disease management.

“By combining national research capability with regional knowledge and expertise, we can develop management approaches that are relevant to WA conditions and support more resilient grain production systems.”

Dr Daniel Hüberli, DPIRD Senior Research Scientist (plant pathology)

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Senior Research Scientist (plant pathology), Dr Daniel Hüberli

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DPIRD Senior Research Scientist Dr Daniel Hüberli explains soilborne disease research and management strategies during a field demonstration.

Supports WA Government priority:
Research collaboration and industry engagement

Big milestones. Bigger impact for growers

From faxed pest alerts to decoding the genetic blueprint of oats, two major DPIRD initiatives recently celebrated milestones after decades of helping protect and advance WA farming businesses.

PestFacts WA celebrated 30 years of helping growers stay ahead of crop threats, while the Western Crop Genetics Alliance (WCGA) marked a decade of accelerating crop genetics research to improve productivity and resilience for WA growers.

What began as a fax-based pest reporting service in 1996 has evolved into one of the grains industry's most trusted surveillance and extension networks, helping growers and agronomists respond rapidly to damaging pests and diseases before they spread across paddocks and impact profitability.

PestFacts WA has played a key role in identifying and tracking major threats including the Russian wheat aphid in the Esperance port zone in 2020, while continuing to provide timely surveillance, seasonal alerts and independent technical advice through weekly newsletters during growing seasons.

DPIRD Research Scientist Cindy Webster using the PestFacts WA Reporter app to report an insect pest in an oat crop.

The service remains a critical line of defence for WA growers, supporting faster on farm responses and helping reduce crop losses during challenging seasons. The service currently operates under a GRDC co-investment project called Seasonal status of pests and diseases delivered to growers.

WCGA, a partnership between DPIRD and Murdoch University, also recently celebrated 10 years of world leading crop genetics research.

The alliance has significantly strengthened barley, oat and lupin breeding capability and helping position WA as a global leader in genetics research across all three crops.

Among its biggest breakthroughs, WCGA researchers contributed to decoding the pangenomes of barley, oats and lupins—major international scientific achievements expected to fast track the development of higher yielding, better quality and more climate-resilient varieties for growers.

Together, the milestones highlighted the long-term impact of DPIRD science in helping WA growers protect crops, improve productivity, sustain quality and remain globally competitive.

To find out more about the PestFacts WA suite of products and sign up to receive the PestFacts WA e-newsletter visit:

PestFacts WA

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WCGA researcher, Prof Chengdao Li

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Journal papers 2026

Crop Protection	Jones, R.A.C. and Congdon, B.S. (2026) Australian Cool-Season Pulse Seed-Borne Virus Research: 3 Pea Seed-Borne Mosaic Virus. *Viruses*, 18(3).
	Lenzo, L., John, E., Bradley, J., Thomas, G., Bennett, D. and Tan, K. (2026) Fair-weather friends. Sequential co-infection demonstrates priority effects in the outcome of *Parastagonospora nodorum* and *Pyrenophora tritici-repentis* polymicrobial foliar disease of wheat. Plant Disease.
Crop Innovation	Piyumi Chathurangi Wanniarachchi, Greg Shea, Mauro Mocerino, Sarita Jane Bennett, Rewati Raman Bhattarai, Ranil Coorey. (2025) What Makes Lupins Less Palatable to Consumers? Can the Sensory Quality of Lupin be Improved and Commercialized? *Comprehensive Reviews in Food Science and Food Safety*, 24(5): e70265.
	Piyumi Chathurangi Wanniarachchi, Sarita Jane Bennett, Greg Shea, Peter Hopper, Mauro Mocerino, Rewati Raman Bhattarai, Ranil Coorey. (2025) Impact of Irrigation Treatment and Sowing Time on Lipoxygenase Activity and Seed Quality of Australian Sweet Lupin (*Lupinus angustifolius* L.). *Legume Science*, 7(3): e70048.
	Piyumi Chathurangi Wanniarachchi, Mauro Mocerino, Mark J. Hackett, Michael Nesbit, Greg Shea, Ranil Coorey. (2025) Comparative analysis of thermal, structural and rheological properties of protein isolates and kernel flour from Australian sweet lupin varieties using soy as a reference. *Food Hydrocolloids*: 112000.
	Jingye Chen …… Chengdao Li. (2026) An ancient super allele of the Vrs1 gene driving the recent success in modern barley improvement through optimising spike architecture. *Journal of Integrative Agriculture*, 5(2): 602–609.
	Brett Chapman, Viet Dang, Tianhua He ….. Chengdao Li. (2026) The graphical barley pangenome reveals micro- and macro-scale genetic variation. *Agriculture Communications*, 4(1): 100131.
	Shunlin Zhang, Tianhua He, Yong Han, Gaofeng Zhou …. Chengdao Li. (2026) Genetic dissection of spike morphology in Australian barley panel: Insights from a multi-model GWAS and haplotype analysis. *Journal of Integrative Agriculture* (in press).

Systems Innovation

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Norman, H. C., M. G. Wilmot, J. K. Hendry, E. Hulm, B. F. Hackney and R. J. Harrison. (2026) Annual Legume Seedbank Management Involves Compromises Between Feeding Value to Sheep and the Impact of Seed Mass and Dormancy on Survival of Ingested Seeds. *Grass and Forage Science*, 81(1): e70033.	
Sharma, Sneha, Harry Eslick, Rodrigo Pires, Balwinder Singh and Hasnein Tareque. (2026) Temporal Sensitivity of In-Season Crop Classification: An Explainable Multi-Year Sentinel-2 Analysis in Western Australia. *Remote Sensing*, 18(10): 1653.	
Kristen Kennison, Steele Jacob, Karyn Reeves, Kevin Lacey and Dario Stefanelli. (2026) Using Preliminary Consumer Insight to Enhance the Perceived Quality of a New Apple Cultivar (*Malus domestica* Borkh. Cv. ANABP 01) with a View to Maximizing Crop Utilisation. International *Journal of Fruit Science*, 26(1): 2620216.	

Professor Chengdao Li has played a leading role in barley research, contributing to advances in crop genetics and varietal improvement.

Where to hear about our work

17–20 August 2026	**Australian Barley Technical Symposium** Geelong, VIC
24–28 August 2026	**Australian Agronomy Conference** Darwin NT
1–5 November 2026	**Soils Science Conference** Pan Pacific, Perth
17–22 November 2026	**International Oat Conference** Chili

DPIRD Broadacre Systems researchers Rodrigo Pires, Jenny Shen, Sneha Sharma with mentors, Hari Suresh (NVIDA, Senior Cloud AI and Gen AI partner) and Yash Gupta (NVIDIA and OpenHackathons Group, GPU Developer Advocate), at the AI for Science Open Hackathon, hosted by NVIDIA and Monash University.

Reach out to the team

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Systems Innovation
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