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LONGITUDINAL CASE STUDY | AUGUST 2026

Long-term collaboration with the Mulgowie Farming Company

Background

Mulgowie Farming Company (Mulgowie) operates a large and diverse vegetable production system across multiple regions of eastern Australia, producing conventional sweet corn, green beans and other vegetable crops.

Led by Andrew Johanson, Farm Operations Manager SEQ and National Agronomy Manager, the Mulgowie team has continued to develop and integrate soil health, regenerative agriculture and improved agronomic practices into its commercial farming systems.

Andrew previously held the role of Sustainable Agriculture Manager, where a strong focus was placed on investigating and developing practical approaches to improving soil health, nutrient use efficiency, integrated pest and disease management, and the long-term resilience of Mulgowie's farming systems. This work now forms an important part of his broader operational and national agronomy responsibilities.

Over many years, Mulgowie has adopted and trialled a range of practices including controlled traffic farming, cover cropping, reduced

KEY MESSAGES

- Long-term partnership with the SWICP project has supported practical, evidence-based improvements across the business.
- Demonstration trials have shown that minimising soil disturbance can improve soil health, resilience and operational efficiency.
- Legume trials have strengthened nitrogen budgeting and fertiliser decision-making.
- Practices have been tailored to local soils and conditions rather than adopting a one-size-fits-all approach.
- Mulgowie has helped other growers by sharing its experiences through industry extension activities.
- The business continues to trial new approaches to improve productivity, soil health and sustainability.

Hort Innovation

This project has been funded by Hort Innovation using the vegetable and melon research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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tillage, compost and organic amendments, improved nutrient management and other regenerative farming approaches. Importantly, the focus has been on taking these practices beyond individual trials and incorporating those that demonstrate practical agronomic, environmental and economic benefits into commercial production.

The Soil Wealth and Integrated Crop Protection (SWICP) project has supported this journey at two key Mulgowie sites: the Lockyer Valley in Queensland and Maffra in Victoria, which has since been sold. The long-running collaboration has provided an opportunity to test, measure and refine soil and crop management practices under commercial vegetable production conditions, helping build a farming system focused on productive soils, efficient input use and greater long-term resilience.

Field walk at Mulgowie Farms as part of the Joel Williams workshop in 2026

Eight years of collaboration

Over the years, Mulgowie's collaboration with the SWICP project has become a lot more than demonstration site host. With willingness to share their knowledge beyond the farm gate, the Mulgowie team has also contributed to mentorship and extension activities, passing on what they have learned to the broader grower community.

Key touchpoints of the eight-year of collaboration:

- **2018 – Gatton, Queensland demonstration trial**
  Early collaboration focused on cover crops, reduced tillage and management of diamondback moth in vegetable systems. This trial helped establish the partnership between SWICP and the Mulgowie team.
- **2020 – Soil Wealth Check**
  A Soil Wealth Check was completed with the Mulgowie team to benchmark soil condition, groundcover, biological activity and management practices.
- **2020–2022 – Maffra reduced tillage trial**
  SWICP supported the Maffra team to trial reduced tillage systems. Although strip tillage had been adopted successfully in Queensland, there was uncertainty about whether it would translate to Victorian soils and climate conditions. With support from SWICP, a locally adapted system was developed and proved successful, leading the business to invest in strip-till equipment.
- **2022 – Biologicals trial in Gatton**
  A demonstration trial investigated biological products including mycorrhizal fungi and their potential role in improving nutrient uptake and soil biology.

- **2023 – Soil Biology Masterclass (Gatton)**
  Andrew Johanson presented on carbon-neutral farming approaches and hosted a field walk on the Mulgowie farm, demonstrating soil biology practices in a commercial vegetable system.
- **2023–2024 – Legume nitrogen trial**
  A detailed demonstration trial investigated the use of faba beans as a nitrogen source for sweet corn, comparing termination methods such as incorporation, spraying and harvesting.
- **2024 – New Zealand study tour**
  Andrew participated in the SWICP study tour to New Zealand, engaging with growers and researchers exploring regenerative agriculture and soil management practices.
- **2024 – Regenerative agriculture webinar**
  Andrew participated as a guest panellist discussing regenerative farming approaches and practical implementation in vegetable production systems.
- **2025 – New Zealand study tour visit to Mulgowie**
  A group of approximately 20 New Zealand growers and researchers visited the Gatton farm, where the team shared insights from their ongoing trials and soil management practices.
- **2025–2026 – Multi-species cover crop trial**
  Building on earlier legume work, a new trial is evaluating a field pea and barley cover crop mix to supply nitrogen and improve soil structure ahead of sweet corn.
- **2026 – Host field walk at Mulgowie Farms**
  The Joel Williams event focused on transitioning soils from conventional to regenerative, building organic matter, healthy soil biology and improved nutrient efficiency.

New Zealand study tour visiting Mulgowie in 2025

Making changes

Over time, engagement with the SWICP project has supported a series of progressive management changes across the business rather than a single shift in practice. These changes have focused on improving soil function, nutrient efficiency, and long-term system resilience.

Reduced tillage

One of the most significant shifts has been moving away from conventional full-width cultivation towards reduced and strip-tillage systems. Reducing cultivation passes helps maintain soil structure, retain organic matter, and minimise erosion, and the results the team has seen on the ground have made a compelling case for taking the approach even further.

Today, a key part of Mulgowie's reduced tillage strategy is assessing each paddock after harvest and asking a simple question: *Does this paddock actually need cultivation before the next crop?*

Rather than applying a blanket 'yes' across the farm, cultivation is only used where it is genuinely required. This paddock-by-paddock approach has helped minimise unnecessary soil disturbance while preserving the gains they have made in soil health, structure, and resilience.

Controlled traffic principles are already incorporated into most of Mulgowie's harvesting operations, with machinery using established tramlines wherever possible. The main challenge is during wet harvest conditions, when it can be difficult to keep heavy machinery on the designated tramlines. This remains an area of focus, particularly around minimising compaction and maintaining the benefits of controlled traffic under challenging field conditions.

The experience at Maffra in Victoria's East Gippsland in 2020-2022 proved to be a turning point in accelerating the adoption of reduced tillage across the business. While Mulgowie had, to some extent, already embraced reduced tillage approaches at its Bowen and Home Hill operations in Queensland, and was beginning to implement them in the Lockyer Valley, gaining traction at the Maffra site proved more challenging.

Through the SWICP project, a strip-till machine was brought to the farm, and the team trialled four different cover crop termination approaches alongside strip tillage, testing what worked best in the region's cooler winter conditions.

It did not take long to see the capability of the strip tillage unit, and its operational fit at the site. The Mulgowie management team purchased the strip tillage machine on the spot after just half an hour of trialling, and what started as a few hectares quickly scaled to the full 200 hectares destined for corn.

Close collaboration between Andrew Johanson, the site's farm team, Elders agronomist Noel Jansz, and Kelvin Montagu from the SWICP project, was key to tailoring the approach to local soils and conditions.

The results were compelling: The corn crop grown in strip-tilled ground was the most uniform the team had seen, with bean yields lifting by 26% and corn yields holding steady compared to conventional cultivation.

Beyond the yield story, the team observed meaningful improvements in soil structure, water infiltration and resilience to weather events, alongside real cost savings in labour, fuel, herbicides and nutrients.

Soil carbon also increased by 0.5% over three years. Like any practice change, there were challenges to work through, including managing pest pressure in the retained residue and fine-tuning cover crop mixes to avoid planter blockages. However, the team's view was clear that the benefits far outweighed the hurdles.

> "The business views soil health as a whole-of-system approach rather than a collection of individual practices," Andrew Johanson

REDUCED AND STRIP TILLAGE MOVES FROM DEMONSTRATION TO STANDARD PRACTICE

Reduced tillage is now standard practice in many parts of the operation, supported by investment in a direct-drill corn planter capable of operating through high-residue conditions. Soil carbon at the Maffra site increased by 0.5% over three years, and the team observed real improvements in soil friability, water infiltration and crop uniformity, changes that flow directly through to more efficient harvesting and better marketable yield.

Read case study here

BALANCING SOIL HEALTH PRACTICES WITH COMMERCIAL REALITY

Andrew Johanson

Striking a balance between soil health and the commercial realities of vegetable production is an ongoing process, and one that requires flexibility rather than rigid rules.

We manage each paddock according to its conditions and the season we're dealing with.

In vegetables, a full no-till system isn't always practical, so we've found strip tillage provides a good compromise between protecting soil health and maintaining productivity.

Timing is a critical consideration. Decisions around cultivation, planting and harvest are made with both soil conditions and business requirements in mind. For example, harvesting or planting in wet conditions can have long-term impacts on soil structure, but delaying operations may affect crop schedules and cash flow. "You have to weigh up whether the return is there to justify the risk of damaging the soil. Sometimes the best decision for soil health isn't necessarily the easiest decision commercially."

The team acknowledges that many soil health practices require upfront investment, while the benefits accumulate gradually over time. However, they are increasingly seeing returns through reduced fuel use, lower cultivation requirements, improved nutrient efficiency and more stable yields. Crops planted into cover crop residues have also shown greater resilience during periods of climatic stress, helping to buffer the impacts of increasingly variable seasonal conditions.

Importantly, the business views soil health as a whole-of-system approach rather than a collection of individual practices. Across the farming operation, teams have worked together to establish a set of guiding principles centred on minimising soil disturbance, maximising soil cover and maintaining living roots wherever possible.

Getting everyone to agree on those principles and take ownership of them has been one of the most important steps.

Once people understand the why, they can work out the best way to apply those principles in different situations and environments.

Cover cropping and nitrogen management

Cover cropping has become strategic across Mulgowie's operations.

Mixed-species cover crops, including legumes and cereals, are used to deliver specific outcomes: nitrogen fixation, nutrient cycling, weed suppression, and soil protection.

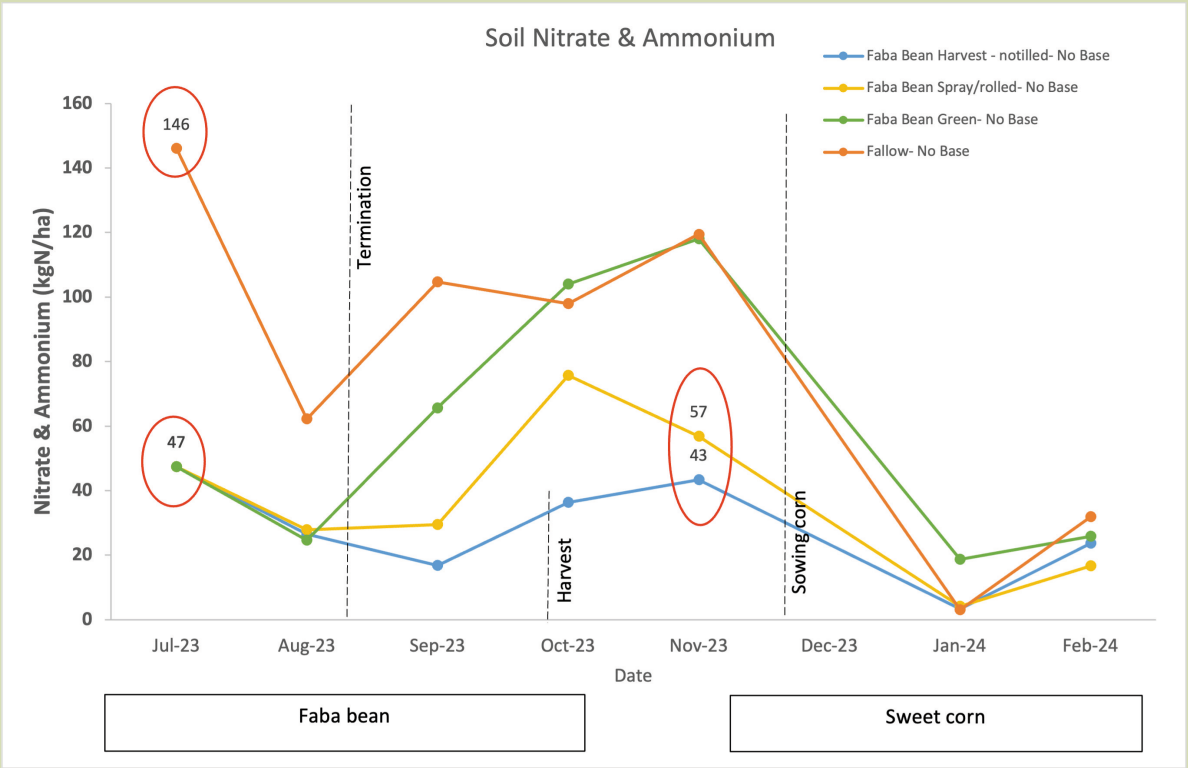
Species selection is increasingly informed by paddock-level soil testing, including Haney tests, allowing the team to tailor choices to specific soil conditions. Where nitrogen levels are already high, cereals may be used to capture the excess; where additional nitrogen is needed, legumes contribute fixed nitrogen.

Termination timing and method are also carefully managed to align nutrient release with the needs of the following crop. At the Lockyer Valley site in Queensland, Mulgowie worked with the SWICP project to trial faba beans as a legume cover crop, testing whether they could meaningfully supply nitrogen to a subsequent sweet corn crop.

Four termination approaches were compared, green incorporation at flowering, herbicide spray with surface residues, growing through to grain harvest, and a fallow control. Soil nitrogen, residue quality and crop performance tracked across the full season.

While a significant flush of Johnson grass weed pressure added complexity to the results, the trial still generated useful insights into how timing and method of termination shape nitrogen availability in the system.

The clearest finding was that *how and when you terminate* matters enormously.



Soil available nitrogen (kg/ha) under different treatments - results part of the 2023-2024 nitrogen trial

Key findings included:

- Green incorporation released nitrogen quickly and produced the strongest corn foliage, while spray termination released it more slowly, a meaningful difference given that corn's nitrogen demand ramps up sharply from the six-leaf stage.
- Taking faba beans through to grain harvest removed around two-thirds of the accumulated nitrogen from the system and left lower-quality residues that were slower to break down.

The trial reinforced a principle now embedded in Mulgowie's approach: release nitrogen too early and it can be lost; too late and it can cost yield.

Nitrogen management has evolved as a result, moving from a straightforward fertiliser-input approach to a more sophisticated budgeting framework. The system now accounts for nitrogen captured in cover crop biomass, removed in harvested crops, and retained in residues and soil organic matter, giving the team a much clearer picture of fertiliser requirements and nutrient efficiency across the rotation.

RETHINKING NITROGEN

The nitrogen trial at the Lockyer Valley provided evidence to support the businesses ongoing approach to nutrient management. While nitrogen decisions continue to be driven primarily through fertiliser management, the collaboration has strengthened the team's understanding of nitrogen cycling and provided data to support a more informed nitrogen budgeting approach.

The findings also highlighted opportunities to improve nitrogen use efficiency and potentially reduce fertiliser costs without compromising crop performance. At the same time, the trial reinforced several important considerations. Harvesting a legume cover crop for grain removes around two-thirds of the nitrogen it has accumulated, reducing the benefit to subsequent crops. The timing of cover crop termination also proved critical, with early termination risking nitrogen losses before the following crop can access it, while late termination may delay nitrogen release beyond periods of peak crop demand.

Read case study here

Legume cover crops at flowering, Lockyer Valley, 2025

Integrated pest management

Integrated pest management has been another area of active exploration with the SWICP project.

In 2018, a significant pest challenge at Mulgowie's Lockyer Valley site prompted a creative approach to integrated pest management (IPM). The previous season, the farming operation had lost its entire organic green bean crop to pod borer damage, highlighting the need for new strategies to manage pests while reducing reliance on insecticides.

Working with the SWICP project, the team explored a range of IPM approaches, including resistance management education, establishing nature strips to encourage beneficial insects, and trialling companion crops within production fields.

One of the most successful initiatives involved inter-sowing buckwheat between every tenth row of organic green beans. Buckwheat was selected because it flowers at a similar time to beans and attracts a wide range of beneficial insects and pollinators.

When organic sprays were applied, the buckwheat rows were left untreated, providing a refuge where beneficial insects could survive and then migrate back into the crop. The results were highly encouraging. The team observed significantly higher numbers of beneficial insects, greater insect diversity, and improved natural pest suppression than in previous seasons. The approach also proved valuable in managing pests such as diamondback moth and reducing pressure from pod borers.

Although they no longer grow organic beans, the success of the trial led to practice change for a few years.

Adoption and impact

Many of the practices trialled through the project have become part of Mulgowie's ongoing farming system.

Cover cropping

Mixed-species cover cropping has continued and is now integrated with livestock and fodder production to maximise benefits across the farming enterprise. Controlled traffic farming also remains a priority, with harvesting undertaken on 3m wheel spacings wherever possible to minimise compaction, although contractor operations such as hay baling are not always able to follow the same traffic lanes.

The business has also continued refining legume nitrogen strategies to better understand how cover crops and crop rotations can reduce fertiliser inputs, while soil biology monitoring has evolved from basic soil assessments to more advanced testing, including Haney tests and respiration measurements. Biological products continue to be evaluated as part of the search for more effective and sustainable production systems.

Reduced tillage

Reduced tillage has remained an important area of focus, although the approach has been adapted to suit local conditions. While strip tillage was viewed as a useful stepping stone towards zero tillage, it proved less suited to Mulgowie's wetter growing conditions and the heavier soils of Bowen and Home Hill.

However, strip tillage continues to be employed at the company's Glen Innes operation where soil types are more favourable. Decisions around cultivation are now increasingly based on objective assessments using tools such as

penetrometers, allowing the team to determine whether tillage is actually required rather than relying on routine cultivation.

Soil health

Improvements in soil health have included better soil structure, increased biological activity, reduced compaction, improved water infiltration and water-holding capacity, and greater resilience during periods of extreme weather.

These benefits became particularly evident during dry conditions, with healthier soils helping maintain more uniform crop performance and yields under reduced tillage systems. Importantly, the business has not experienced the yield decline sometimes associated with the transition to conservation systems, provided operations occur under suitable soil conditions.

Instead, the team believes healthier soils make minimum tillage easier to implement successfully. Soil carbon levels have also increased, creating opportunities for carbon credits while simultaneously improving water and nutrient retention.

Operational, economic, and community

The project has supported practices changes that have delivered operational benefits, including reduced fuel use, lower labour requirements, decreased herbicide and phosphorus inputs, and the ability to use smaller machinery, further reducing the risk of soil compaction.

Equally important has been the commitment of staff, who have embraced the changes and played a key role in their successful implementation. While the team is confident

> "One of the greatest impacts of the SWICP project has been the ability to generate data that demonstrates the value of these practices to both management and staff."

the practices can deliver significant benefits, they emphasise that there is no one-size-fits-all approach. Success depends on making informed management decisions based on seasonal conditions and ensuring soils are in the right condition before implementing reduced tillage practices.

Beyond the on-farm outcomes, the project has provided valuable opportunities to identify new areas for research, access support to solve practical production challenges, and build strong networks with other growers, farming businesses and researchers. These connections have helped accelerate learning and given the team confidence to trial new approaches.

What's next

Looking ahead, Mulgowie is placing a strong emphasis on crop nutrition, with the goal of producing healthier crops, healthier product for healthier people.

A key focus is using sap testing to drive more precise fertiliser strategies, alongside exploring biological nitrogen replacement to improve efficiency and sustainability. The business is also investigating how increasing the nutrient density of produce can influence shelf life, while building evidence to support these benefits. Mulgowie is keen to share its findings with the wider industry, believing there are benefits for everyone in improving crop nutrition.

Further reading

Soil Wealth ICP grower panel discussion – 2022 Annual Vegetable Industry Seminar

Lockyer Valley, Queensland, study tour: recap and reflections

International, science-based perspectives on practical soil health and regen ag

Scan or click on the QR code to download the PDF

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