



CASE STUDY | OCTOBER 2026

INPUT COSTS DOWN, CARBON UP

Tarwin VIC demonstration site



Overview and purpose

The Soil Wealth ICP Tarwin demonstration site in South Gippsland, Victoria aims to maintain soil carbon in a clay loam greenfield site which has been converted from pasture to a vegetable production system rotation (predominantly celery, leek and spinach).

To achieve this, a combination of different cover crops, minimum till and compost were trialed with host grower Adam Schreurs of Schreurs & Sons. Four combinations of practices (treatments) were compared to grower standard practice (control) and a reference site (existing pasture):

1. Composting and minimum till
2. Cover crop (rye grass/oat/vetch/pea mix) and cultivation
3. Composting and cultivation
4. Cover crop (rye grass/oat/vetch/pea mix, and faba bean) and minimum till.

The trial has now completed its fourth season, with the rotation including cover crop (sown September 2025), spinach, celery, then back into a cover crop (sown September 2026). The role of minimum tillage in the treatments may

Key findings

A trial to maintain soil carbon in a celery, leek and spinach production system delivered the following benefits to the grower:



33%

reduction in diesel use due to less tillage



50%

reduction in labour cost due to less tillage



50%

reduction in irrigation in the first six weeks of crop establishment



3^{out} of 4

combinations (treatments) showed an increase in soil carbon due to cover crops, minimum till and/or compost, compared to grower standard practice (control).

This resulted in:

~\$2,300/ha
net increase in profit
in the trial area





have been neutralised in the past 12 months due to the grower needing to land plane and reform beds to integrate GPS-controlled machinery across the farm.

This case study outlines how changes in management practices influenced soil carbon and other key soil parameters as well as profitability at the demonstration site from 2023 (Year 1) to 2026 (Year 4).



Image: Celery transplants in the trial area, April 2026

Results and insights

Soil carbon

Soil carbon underpins productive and resilient vegetable soils, supporting soil structure, water storage, nutrient cycling and biological activity. For intensive vegetable cropping businesses, maintaining soil carbon can improve soil air supply and feed soil life. Soil carbon is generally considered high if above 5% in high annual rainfall areas (>400-600mm/yr), with baseline values in the grower standard practice (control) at 5.9% in 2023 (Year 1).

Soil carbon was highest for cover crop and cultivation (7.1%, Treatment 2) in 2026 (Year 4) and has increased the most (1.6 percentage points, 29%) against the baseline of 2023 (Year 1). This was followed by composting and cultivation (6.7%, Treatment 3) and composting and minimum till (6.4%, Treatment 1) (Figure 1).

Soil carbon has been most stable over the past four years in the cover crop and minimum till (5.2%, Treatment 4) and grower standard practice (6.1%, control). There have been some fluctuations in the reference site (existing pasture) over the past four years.



Figure 1: Organic carbon percentage over the four-year trial



Nitrogen

Total available nitrogen indicates the pool of nitrogen readily available to crops, supporting plant growth, yield and quality. Monitoring nitrogen helps growers fine-tune fertiliser applications, improve nitrogen-use efficiency and reduce the risk of nutrient losses to the environment. Total nitrogen is generally considered low if less than 25 kg/ha and high if above approximately 100 kg/ha.

Total nitrogen was highest for composting and minimum till (84.3 kg/ha, Treatment 1) in 2026 (Year 4) and has increased 24% against the baseline of 2023 (Year 1). This was followed by grower standard practice (54.6 kg/ha, control) and cover crop and minimum till (50.4 kg/ha, Treatment 4) (Figure 2).

There was a significant spike in total nitrogen in 2024 (Year 2) across all treatments and the control following high fertiliser application, which has declined over the past two years. Total nitrogen was lowest in cover crop and cultivation (33.8 kg/ha, Treatment 2) and composting and cultivation (34.4 kg/ha, Treatment 3).

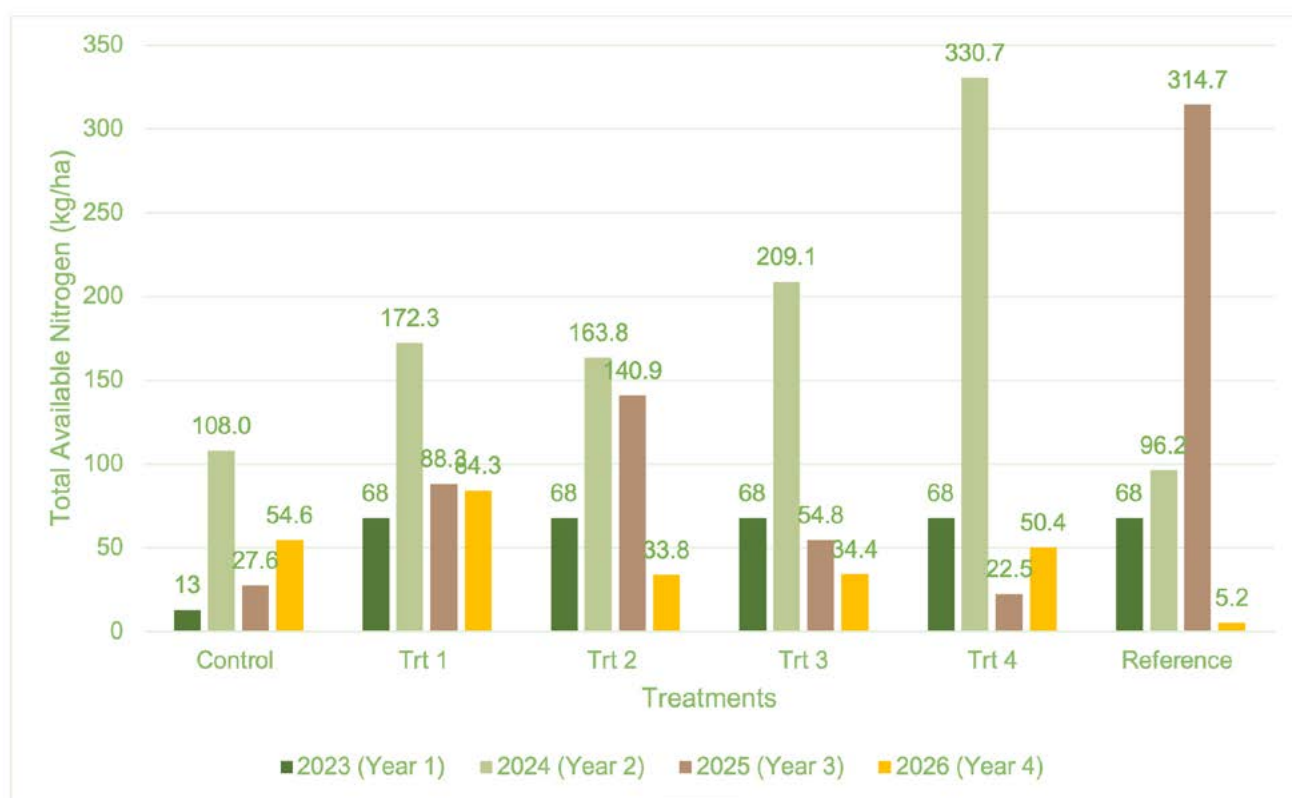


Figure 2: Total available nitrogen over the four-year trial





Carbon to nitrogen ratio

The carbon to nitrogen (C:N) ratio indicates the balance between carbon and nitrogen in soil organic matter, influencing decomposition rates and nitrogen availability to crops. Monitoring C:N helps growers understand nutrient cycling and potential nitrogen immobilisation. The C:N ratio is generally considered low (excess nitrogen) if less than 10:1 and high (excess carbon, slows nutrient cycling) if more than 25:1.

The C:N ratio was in the moderate range of 16.1 to 17.4 across all treatments and the control in 2026 (Year 4) (Figure 3). This indicates that soil microbes are less likely to compete with the cash crop for nitrogen (nitrogen fixing or draw down), but there is also no excess nitrogen and limited leaching risk.

The reference site (existing pasture) has consistently had the lowest C:N ratio of 12.1 to 13.3 over the past three years.

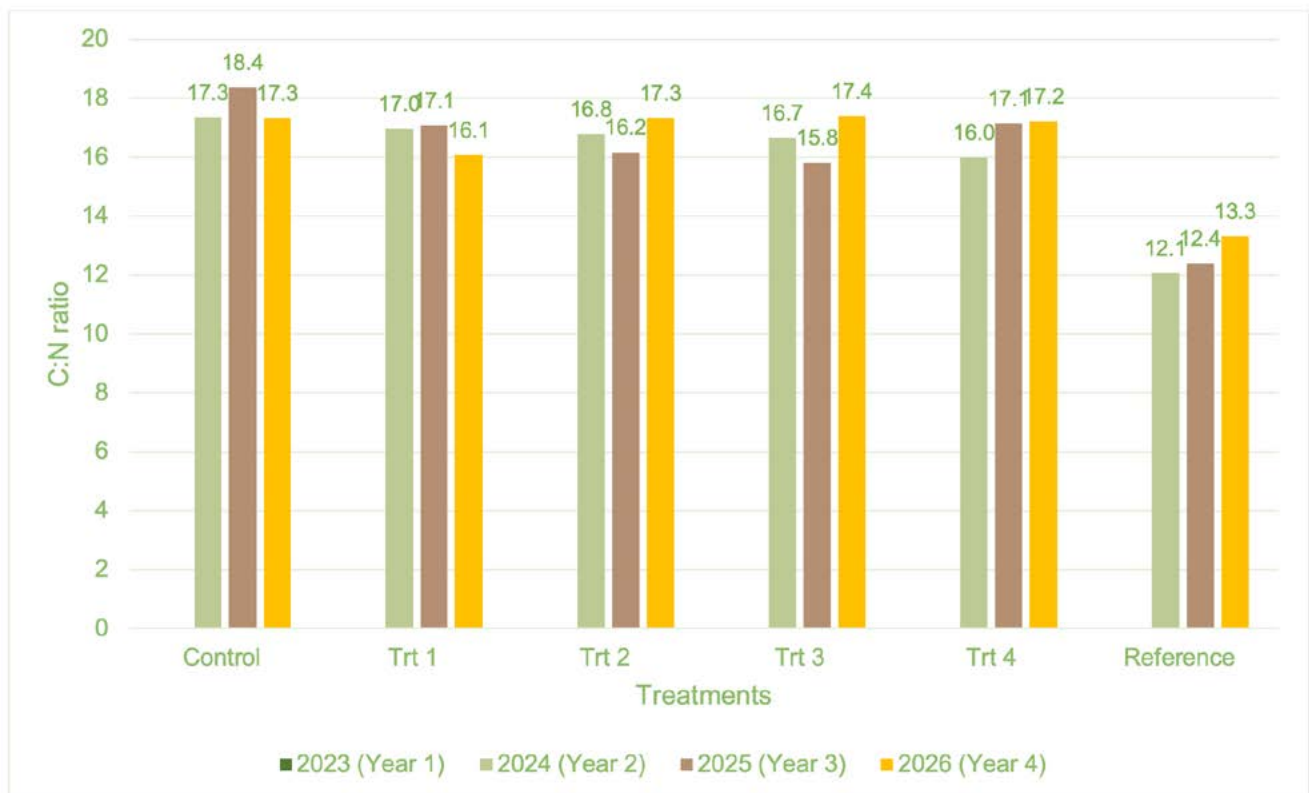


Figure 3: Carbon to nitrogen ratio over the four-year trial





Calcium to magnesium ratio

The calcium to magnesium (Ca:Mg) ratio provides an indication of the balance between the two cations, which can influence soil structure, nutrient availability and root growth.

Well-structured soils generally have more than twice as much exchangeable calcium as magnesium. A ratio of less than 2:1 is considered low and can be associated with reduced soil stability, while a ratio greater than 10:1 may indicate magnesium deficiency.

The Ca:Mg ratio was in the moderate range of 6.9 to 8.4 across all treatments in 2026 (Year 4), with the highest being composting and cultivation (8.4, Treatment 3). The grower standard practice (control) was lower at 5.7, which may explain some of the bed slumping issues after heavy rainfall experienced during the past season (Figure 4).

The Ca:Mg ratio was consistently lowest in the reference site (existing pasture) ranging from 2.9 to 4.7 over the past four years.



Image: Soil samples showing the difference in soil structure across the treatments, control and reference site, April 2026



Figure 4: Calcium to magnesium ratio over the four-year trial



Grower benefits – improving profitability and sustainability

The host grower, Adam Schreurs, highlighted the following benefits from the demonstration site:

“We’ve used less fuel, less labour, less machinery hours all together, to end up with the same result of crop [to previous practices], and used less water. So that’s been a real win so far.” This has meant a:

- 33% reduction in diesel use due to less tillage
- 50% reduction in labour cost due to less tillage
- 50% reduction in irrigation in the first six weeks of crop establishment.

Adam also mentioned the cover crops have provided “better cycling of nutrients in the ground for the next “crop.”

To quantify these financial benefits a partial budget analysis was undertaken for the Tarwin demonstration site in 2026 (Year 4). Partial budget analysis is a farm-level financial tool used to assess the economic impact of changing a specific production practice. It focuses only on the costs and benefits that are expected to change as a result of the practice change, rather than assessing the profitability of the whole farm.

The partial budget analysis showed the main benefits were reduced costs from less diesel, labour and irrigation of approximately \$3,690 per hectare. The additional costs included cover crop seed and sowing, compost and increased herbicide use from more weed pressure in the trial area of approximately \$1,350 per hectare.

This resulted in a **net increase in profit of approximately \$2,300 per hectare** in the trial area (Table 1).



Image: Adam Schreurs providing an overview of production during a New Zealand industry study tour visit to the demonstration site, May 2026

Table 1: Results of the partial budget financial analysis (\$/ha)

Component		Result (\$/ha)
A	Additional revenue	\$0
B	Reduced revenue	\$0
C	Additional costs	\$1,346
D	Reduced costs	\$3,687
	Net change in profit (= A-B-C+D)	\$2,341



Where to next?

The trial will continue into a fifth year exploring the influence of cover crops, minimum till and compost on soil carbon. Stay tuned to the Soil Wealth ICP website and socials for updates.

soilwealth.com.au/page/tarwin-vic/

Further information

You can read and watch the following additional demonstration site updates:

- On-farm trials deliver real results for growers article and video
soilwealth.com.au/2026/07/on-farm-trials-deliver-real-results-for-growers/
- Ground cover generates great result for carbon article and video
soilwealth.com.au/2026/06/ground-cover-generates-great-result-for-carbon/
- Driving Trans-Tasman collaboration and soil health innovation article
soilwealth.com.au/2026/05/driving-trans-tasman-collaboration-and-soil-health-innovation/

You can access the following useful resources for further information:

- Carbon storage in vegetable soils fact sheet
soilwealth.com.au/2016/05/carbon-storage-in-vegetable-soils/
- The Carbon Series Part 2: Soil carbon and carbon sequestration global scan and review
soilwealth.com.au/2022/01/the-carbon-series-part-2-soil-carbon-and-carbon-sequestration/
- Labile carbon fact sheet
soilwealth.com.au/2018/09/labile-carbon/
- From principles to practice: Regen ag toolbox for productive horticulture article and fact sheet
soilwealth.com.au/2026/06/from-principles-to-practice-regen-ag-toolbox-for-productive-horticulture/
- How do you know your soil is healthy? Top tips for vegetable growers fact sheet
soilwealth.com.au/2020/12/how-do-you-know-your-soil-is-healthy-top-tips-for-vegetable-growers/



Image: Harvesting celery in Tarwin, May 2026