

# Soil, stock and carbon trifecta

**A**n MLA Donor Company-funded project is giving producers a closer look under the surface of their paddocks, to hone strategies which increase the trifecta of livestock productivity, soil moisture retention and soil carbon.

Milton Curkpatrick and Hamish Webb, co-directors of Precision Pastures, are on their third year of a five-year integrated research and development project centred around 10 Producer Demonstration Sites (PDS) in the New England region of NSW.

They are testing the interrelationship between pasture biomass production, soil moisture and soil organic carbon levels, and recording baseline data for factors which feed into the relationship between these.

Measurements include:

- plant available water
- water holding capacity
- soil organic carbon
- seasonal pasture mass (kilograms of dry matter/ha)
- live weight gain.

The heart of the project is to test if carbon levels, soil moisture and livestock production have an intrinsic relationship, where if one measurement improves, the others improve with it – or one worsens, so does the others.

Early data shows this is the case.

“We’ve always believed livestock can have a positive impact on the carbon cycle and carbon sequestration in the soil and, as a result, available soil moisture levels improve as a consequence – this project is close to proving this concept,” Hamish said.

“MLA has played a big role in the research and development of the soil carbon method\* of calculating baseline emissions through livestock metabolism, soil additives, residues and irrigation energy, and it’s proven itself to be highly credible.

“It’s a win-win for red meat producers – better soil, more livestock and higher carbon credits.”

### Flow-on impact

So far, the project has shown a 1% increase in soil carbon down to 30cm could:

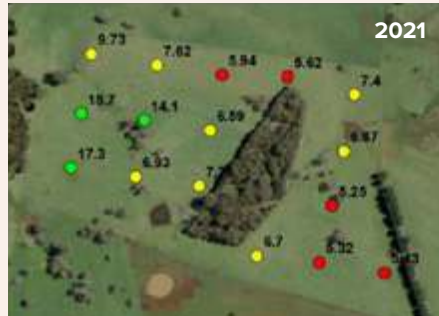


Figure 1. Paddock comparative SOC% results on 1 ha grid, 0-15cm: 2021–2022. Carbon % ● <6, ● 6–10, ● >10.

- create 150,000 litres of increased moisture retention per hectare
- help increase biomass production by up to 30%
- sequester 165 tonnes of CO2 from the atmosphere per hectare
- convert to 165 Australian Carbon Credit Units (ACCUs), worth approximately \$5,000/ha in today’s market.

However, these carbon improvements are heavily impacted by soil health – including pH (non-neutral), toxicity and nutrient deficiency.

“One producer from Ebor recorded an annual average soil organic carbon (SOC) increase of 0.31% across their demonstration site and a 2% SOC increase in more than one of the sample sites, including an already high result of 16% to even greater 18%. Milton said. “

This location (site 6) sits within a localised soil type zone (that includes sites 7, 10), which has fewer soil health issues and has therefore returned noticeably higher levels of SOC.”

Figure 1 illustrates the location of the high SOC% site and the other two sites with high test results within the 18ha paddock.

“While these results are very impressive and provide an example of the extent of the potential for raising soil organic carbon levels by solving soil health issues, some SOC levels were also lower highlighting the variability of soil carbon levels especially at shallow depths (0-15cm).”

“These results are just a small sample of the five-year project and we look forward to sharing the next round of sampling in September this year,” Milton said.

### Take action

Milton said producers who want to know more about what’s happening under the surface can install probes to collect soil moisture levels. This can shed light on their soil’s current state, to identify how it can be improved through carbon-focused management.

“We want producers to know the needs of their enterprise, and with this in mind, they can look at this data that has been proven over the 10 sites we have tested on and make their decisions from there,” Milton said.

The project aims to develop tools and calculators for producers to make production decisions, particularly in terms of relating water use efficiency to pasture biomass levels and in turn soil carbon sequestration predictions. ■

### TO DO

Access handy seasonal resources at:

👉 [mla.com.au/feedbase-hub](https://mla.com.au/feedbase-hub)

👉 Check out pasture improvement and carbon calculators: [mmla.com.au/tools-calculators](https://mla.com.au/tools-calculators)



👉 Scan this QR code to read *Sustainable grazing – a producer resource*



👉 Scan this QR code to read *Carbon accounting technical manual*

Table 1. Ebor Producer’s Paddock Trial Results – Soil Organic Carbon (0-15cm)

Result (Site)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Avg.
2021 SOC %	9.7	7.6	5.9	5.6	7.4	15.7	14.1	6.6	6.9	17.3	6.9	7.3	5.3	6.7	5.3	5.4	8.36
2022 SOC %	10.7	5.7	6.3	7.3	5.4	18.3	14.9	6.6	6.2	16.3	7.2	7.1	6.6	5.6	8.0	6.8	8.67
Change in SOC %	1.0	-1.9	0.4	1.7	-2.1	2.6	0.8	0.0	-0.7	-1.0	0.3	-0.2	1.3	-1.2	2.7	1.4	0.31

\*The Clean Energy Regulator’s soil carbon initiative methodology – to learn more, visit [cleanenergyregulator.gov.au](https://cleanenergyregulator.gov.au) and search ‘soil carbon project’.

# Integrated approach drives productivity

**G**ary and Rhonda Olrich’s holistic approach in their New England beef business made them the perfect fit to participate in a project which dug deeper into how grazing practices impact livestock health and productivity, and how soil moisture and carbon can come along for the ride.

The MLA Donor Company project, in partnership with Precision Pastures (see story opposite), has fuelled the couple’s drive to find solutions to their production challenges.

“You’ve got to improve your knowledge – grazing practices, sustainability, holistic management, everything,” Gary said.

“Getting that education from professionals and like-minded people and then implementing it is the most important part of the job.”

## Improved pasture management

For Gary and Rhonda, the change to grazing practices on their Woolbrook property, ‘Glenview’, was driven by their goal to improve animal health, as well as a desire to maintain productivity and carbon levels.

Their shift to rotational grazing, hand-in-hand with more effective drenching, combatted the property’s barber’s pole worm burden, and provided better nutrition for sheep and cattle.

It also underpinned the Olrichs’ realisation of the foundational impact these changes have on soil health, pasture productivity and carbon sequestering, alongside their focus on animal health.

Gary and Rhonda primarily target the feedlot market with steers, which are bred at Glenview and backgrounded on their other properties. They target an average

turn-off weight of around 400kg, with a focus on feedlots that promote and support sustainable products.

“We’ve made a strategic shift with moving from set stocking to rotational grazing, so now we’re subdividing and monitoring our paddocks before and after grazing.

“We could benefit from more stock in our rotation to get right down to the soil, but our rotations aren’t regular – they’re done every few days with respect to the impact on our soils,” Gary said.

“We want to monitor our stock and make sure we aren’t sacrificing production value, while still maintaining soil health and sequestering carbon.”

## Variables affecting carbon

Although Gary and Rhonda’s improved livestock management has helped in their carbon sequestering, they’ve experienced an overall drop in carbon since 2020 (see graph below).

The graph shows the variability of carbon levels across Glenview – ranging from 0.95% to 1.94% – as well as a 0.3% drop of overall carbon levels from 2020 to 2022.

However, the project revealed this decrease was due to high rainfall and oversaturation of soil, and Gary and Rhonda’s effective grazing practices have, overall, produced a relatively consistent maintenance of carbon levels.



## SNAPSHOT

**GARY AND RHONDA OLRICH**, ‘Glenview’, Woolbrook, NSW



**AREA**  
930ha

**ENTERPRISE**  
Breeding sheep and cattle

**LIVESTOCK**  
250 Angus cattle and 1,000 Merinos

**PASTURES**  
Native

**SOIL**  
Granite, basalt

**RAINFALL**  
780mm

## On-farm values for sustainability and enterprise

Gary and Rhonda’s balanced approach to their carbon and grazing project has seen their focus on livestock production hold steady while maintaining their carbon and sustainability goals.

For example, they align with quality assurance programs which specifically help promote and produce sustainable products.

Looking ahead, their plans to increase cattle production, use artificial insemination to access genetic gain, and improve fencing and infrastructure, are underpinned by their focus on productivity in tandem with sustainability.

Despite the initial outlay to set up soil monitoring and baseline assessments, Gary said their focus on sustainability will add up for their business.

“We believe consumers will be prepared to pay more for products that help the planet, and that’s the path we should be promoting. People have more knowledge about how our work effects the world and how their purchases go into that, so if we are working towards that, in the future, we see it as a really profitable venture,” Gary said. ■

✦ The variability of carbon levels across ‘Glenview’ between 2020 and 2022.

