‘Efficient farms reduce emissions’

Improving farm efficiency and reducing greenhouse gas (GHG) emissions go hand in hand.

Sassafras, Tasmania

At a glance

<table>
<thead>
<tr>
<th>Owner &amp; location</th>
<th>Matthew and Ruth Young Elphin Grove</th>
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</thead>
<tbody>
<tr>
<td>Property size</td>
<td>220ha</td>
</tr>
<tr>
<td>Enterprises</td>
<td>Peas, poppies, celeriac, beef cattle and fat lambs</td>
</tr>
<tr>
<td>Average annual rainfall</td>
<td>900mm</td>
</tr>
<tr>
<td>Soil types</td>
<td>Sandy loam, Sandy and clay loam</td>
</tr>
</tbody>
</table>

Healthy soils for healthy profits

Sassafras farmers Matthew and Ruth Young are planning ahead. By looking after their natural resources they are making sure their farm remains profitable into the future.

Taking advantage of opportunities has seen Matthew involved in project and grower discussion groups, Landcare grants and whole farm planning. In 2009, he joined the Climate Ready Farming Leaders (CRFL) group, a project designed to expose farmers to different management options, business models and enterprises dealing with change. For Matthew the group reinforced decisions he had already made about improved management practices and introduced him to innovative methods of farming. One of the main take home messages he gained from the project was that you don’t need to implement the big changes straight away. You can start small.

“Whether you believe in climate change or not, the seasons are changing. Whether it’s natural or a man-made change, you can’t deny that things are totally different to what they have been. You’ve got to be prepared to adapt your practices and if there are opportunities to look at different ways of doing things to make life easier and more profitable, then I reckon it’s worth going for it” says Matthew.

By Ashley Hobbins
Healthy soils for healthy profits

Spending a small amount of time “doing things right” is paying off for Matthew. Improved soil structure means spending less time in the tractor preparing ground, in turn reducing the potential for carbon dioxide emissions from soil and from machinery.

Minimal tillage has played a big role in improving the farm’s sustainability and bottom line. By going to a one-pass system, soil health and productivity has improved, while time and input costs have also reduced. “The practices we have at the moment have allowed us to get all our crops in this year (2013), even in a bad spring. When our neighbours were rushing to get crops planted before the bad weather, we had all our paddocks, bar one, done” says Matthew.

Matthew is also using low impact tyres on his machinery, and GPS technology. When possible, all spraying, seeding and fertilising is done on the same tracks to reduce soil compaction across the paddock.

Moving from short-term to long-term perennial grass species has helped improve soil structure.

Matthew also uses green manure crops. Rather than leave the soil fallow he plants ryegrass between each crop. This contributes to the farm’s stores of soil carbon (see ‘Black Magic’ results p3).

All waterways and runoff areas are fenced to protect the soil from stock damage, native vegetation is undergoing revegetation and weed control, and current areas of bush are being preserved. Matthew has seen less wind erosion as a result, especially on the sandy paddocks, and their livestock are maintaining weight better.

Crop rotations have been fine-tuned, with Matthew looking at the viability of all crops grown. He finds new opportunities; 50,000 celeriac bulbs are now grown for local and Melbourne markets.

While business profitability is a key driver of change, there have also been improvements in soil health. Matthew is getting the best of both worlds.

He says, “At the end of the day … I do it to improve my business profitability. It’s a win-win situation.”

Soil organic carbon (SOC) plays a major role in soil health. It provides resilience against pH change, aggregates soil (improves soil structure), enhances water-holding capacity, and moderates soil temperature. SOC also reduces potential nutrient losses (e.g. by leaching or emissions) by increasing nutrient holding capacity.

The amount of carbon found in soil is the balance between the inputs from plant and animal material and, the constant losses from decomposing carbon.

Productivity is the key.

More plants = more roots = more SOC

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'Black Magic' is a soil carbon-modelling tool developed by the Tasmanian Institute of Agriculture (TIA). It predicts changes in soil carbon over time, and can be used to compare different scenarios for current and planned practices e.g. different crops, rotations or residue management.

As part of this project, we worked through this tool with Matthew, putting a typical rotation through 'Black Magic', and finding that the practices implemented (such as crop selection, green manures and minimal tillage) have helped to maintain soil carbon.

Over a 25-year simulation, the predicted carbon loss was reduced. Under previous practices soil carbon levels were predicted to reach 2.56%, but with the implementation of new practices the predicted level was 3.29%. That's a total mitigation of 2,560kg carbon dioxide per hectare per year.

This change may not seem like much, but to increase soil organic carbon by 1% requires the equivalent of adding 40t of dry matter per hectare.

‘Black Magic’ highlights the importance of pasture in the rotation; it makes the biggest contribution to soil carbon at Elphin Grove.

Where to next…

Being involved in projects such as this is one way for Matthew to continue to seek out opportunities to help improve the overall sustainability of his business, including practices that lead to emissions reduction.

With the proportion of livestock on the property increasing, grazing regimes, stocking rates and potential methane emissions are other options for Matthew to examine through this project.

Remnant bush across the property is earmarked for re-vegetation and new technologies, such as Controlled Traffic Farming (CTF) and variable rate irrigation, are in his sights.

Matthew is positive about the future and has a pragmatic approach. He realises that things sometimes happen outside of his control so he focuses on “getting it mostly right, most of the time”.

Key lessons

- You don’t need to implement the big changes straight away, go for the “low hanging fruit”
- No one is perfect. “Focus on getting it mostly right, most of the time”
- Reducing emissions and sequestering carbon is a ‘win-win’ for addressing climate change and improving productivity