



Soil Health Program - Cover cropping and Subsoil improvement

"I want to be productive, but I also want my farming system to be very resilient. As our soils are old and naturally degraded so we needed to find a way to enhance soil health, to improve structural integrity, increase biological activity along with building carbon and nutrient levels but not at the expense of feeding our sheep and running a profitable business. Cover cropping seemed like the logical thing to do, and it's pretty simple." Simon Falkiner (Participant)



Large Farms project Overview

The Large Farms project, titled Improving On-farm Soil, Vegetation and Biodiversity for Larger agricultural enterprises in the Corangamite Management Unit (Large Farms), has delivered new knowledge and skills to broadacre farmers in the Corangamite Region.

The Large Farms project is split into four sub-projects with three of them being delivered through external project partners –

1. Soil Health Program - Southern Farming Systems (SFS),
2. Sustainable Dairies Program - West Vic Dairy and Agriculture Victoria
3. Master Tree Growers Courses - the Otway Agroforestry Network
4. Innovation and exchange program with Landcare

The Large Farms priorities include increasing soil carbon, native vegetation and biodiversity on-farm while improving knowledge and management practices around soil acidification and climate change adaptation.

Sub-project Overview – Soil Health Program

Establishing investigations to demonstrate the use of municipal green waste and other green materials to improve subsoils and increase soil carbon, including cover crops, this sub-project leverages local municipal councils, use of existing Southern Farming Systems (SFS) subsoil machinery, and an Ag Excellence Alliance NLP2 Smart Farming Project on cover cropping.

Cover cropping

Cover cropping is the practice of growing an annual multi species crop out of season, where plant growth is low (summer and winter) to reduce topsoil erosion, improve biomass content in the soil, reduce weeds and, overall, improve soil health, as well as fill feed gaps for livestock. Cover cropping is also a long-term solution to soil improvement.

Sub Soil Amelioration

Subsoiling is the practice of improving soil conditions underneath the topsoil layer to create more favourable growing conditions for plant roots. Subsoiling involves using machinery to place an organic material deep down into the B Horizon soil layer that is hostile to plant growth. This allows root systems to reach more nutrients at greater depths, allowing for greater carbon storage, soil stability and nitrogen fixation.

Project Timeframe

2018-2023

Key messages and results

Cover Cropping:

- Soil health benefits, including the building of stable soil carbon levels, take time to generate and need careful management to maintain levels.
- Animal and crop production benefits can be achieved through targeted cover cropping activities. The financial boost generated can help fund the the gradual soil health benefits that accompany the the implementation of a cover cropping program.
- There are opportunities to both summer and winter Cover Crop. Winter cover cropping is more reliable due to our reliable winter rainfall, summer cover cropping relies more heavily on out of season rainfall.
- Being prepared and having an outcome in mind is essential to ensure success.
- Revise/condense annual production plans to capture short term weather/market related opportunities that can be realized by the implementation of a cover cropping program.
- Just because you put a cover crop in doesn't mean you are going to save our soils. An integrated management plan is essential.

Sub Soil amelioration:

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- Consistent yield responses of 25% can be delivered by undertaking sub soil amelioration work. These responses have been achieved in both research and commercial conditions.
- The key to success is understanding that what is in the soil is limiting your production systems, and formulating an amendment blend that combats those limitations.
- Organic urban and intensive animal production waste provides a great base for amendment blends and fits nicely into a circular economy providing an outlet for waste streams that currently head to landfill/stockpiles and a source of nutrient and carbon for our agricultural enterprises.
- The perception that subsoiling is expensive, (\$500 to \$1000/ha) has eased with the rapid increase in land prices to \$20,000 to \$25000/ha recently.
- There are now commercially available machines operating at a feasible work rate. 2 to 5ha/hr.

Funding

This project is supported by Corangamite CMA, through funding from the Australian Government's National Landcare Program.

Activities

Activities in the sub-project included demonstrations and investigations with replicated trials being run across the region, with research officers measuring and collating crop and pasture growth measurements and lab testing results. Landcare and Farmer Groups have partnered with Southern Farming Systems to deliver field days to look at the demonstration sites and discuss results.

Partners

Southern Farming Systems

Key drivers for landholders participating

Cover cropping

- Having an insurance feeding system to cover extended dry periods.
- Improving soil quality
- Improved climate resilience
- The ability to crop during summer and winter
- Increased biodiversity in monoculture cropping paddocks

Sub Soil Amelioration

- Improved soil quality through greater organic matter composition
- High quality pasture
- Improved stock health
- Improved climate resilience

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- Healthier soil for worms, invertebrates and fungi to thrive

Participant testimonial

Simon Falkiner

Simon Falkiner is a private consultant and agricultural researcher, and has a 350-hectare Merino and beef farm on the outskirts of Geelong. Simon is one of the few who still cultivate Meat Merino's in Western Victoria.

Sheep are Simon's lifelong passion, and he currently has about 1000 Merino ewes. The Falkiners took up cropping around 25 years ago. Simon found after enduring climate change and the variable rainfall events, there were some real opportunities, especially over summer to get a cover crop in, grow it and use it to feed the livestock during those challenging times.

Simon discovered that while most people think that cover cropping is just a summer option, Cover Cropping during winter became a good fit in Southwest Victoria.

Simon's experience shows how cover cropping allows farmers to keep their costs down, you can go in at a very low price with just the seed, and then if you get an established crop, you can push it along with fertilizer. So, it's not like a winter cropping system, where the expense is considerable and upfront; a farmer can sit on the fence and respond to current conditions.

Simon's fat sheep and bushy paddocks have turned a lot of heads; they have had quite a bit of interest in this trial, especially with their winter cover cropping; they used Moby Barley and Vetch they gave it a hit of Gramoxone, which then flourished.

The Falkiners have also experimented with subsoiling; Simon spends much time analysing his soil make-up. As a result, they have gone from having a white sandy layer to a dark soil colour over four years. Darker soil indicates higher carbon levels that correlates with improved sequestration from pastures and crops as a result of subsoiling. Simon has found subsoiling adds nutrients and carbon to the hostile area and improves root development.

Will Dexter

Will Dexter is a manager on a large farm and works on his property near Beeac in Victoria. Will is a massive proponent of cover cropping, with his stock significantly benefiting from the practice.

Will believes that cover cropping helps grow more dry matter per hectare, which improves soil life. In addition, having diversity above the ground usually means you end up with variety below the ground, building resilience in the pasture and keeping it green for longer.

The farm Will manages recently purchased a new piece of machinery called a Soilkee to help make their multi-species planting more efficient. They wanted to establish a multi-species pasture and getting a Soilkee was the best way of sowing the seed without having to spray any chemicals and to get other species established.

Will's farm is highly resilient; the cattle that feed on that growth have very few health issues, get a balanced diet from the species, and can choose which food they want. In the future, there is an opportunity to plant quicker-growing annuals in autumn to ensure they have a more significant feed wedge in late winter.

One drawback of not using pesticides, is there is a slight increase of insect attacks. Will maintains that this is manageable; he said you just must let that go, and you will eventually work out which species are more resilient to insects.

Will says that there aren't that many people that do what they do, it's gotten great results for them over the past 25 years, and it doesn't cost much money.

He also has dung beetles on his property that enable natural, non-mechanical subsoiling activities by adding more organic matter into the soil and improving soil filtration to reduce the impacts of soil compaction and pugging.

Next steps

Current funding for the program through the National Landcare Program finishes in June 2023,

Cover cropping has been widely adopted throughout the Corangamite region with many community and industry groups undertaking trials and promoting the benefits.

Sub soil Amelioration continues to gain interest from landholders and industry groups with the work continuing to be led by Simon.

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