

'From the Ground Up' Project

Integrating agricultural and environmental practices to improve farm production and biodiversity

Sub-project details 2019-2023

Number	Project Title	Project Lead	Project Partners	Project Description
Priority: Soil Carbon				
1	Boosting soil carbon on farm	Goulburn Broken CMA	Goulburn Broken CMA	This project will address the issue of soil carbon loss through promoting understanding of the soil carbon cycle and practices that minimise losses and encourage gains. Soil carbon levels are primarily driven by soil type and climate; however, soil management has a large impact too. This project aims to increase farmers' skills to increase and manage soil carbon stocks to natural levels where they have been degraded through historical practices. The project will deliver eight workshops. Practices may include but are not limited to, grazing management, ground cover monitoring, soil carbon cycling and mechanisms of soil carbon storage theory, organic soil amendments, pasture and cover cropping.
2	Growing Regenerative Farming Systems	Goulburn Murray Landcare Network and Upper Goulburn Landcare Network	Goulburn Broken CMA	This project will continue the learning of land management practices that enhance provision of soil ecosystem services. It will provide practical learning opportunities where farmers and land managers come together and hear from experienced presenters and share their own experiences. By arming farmers with positive/proactive management techniques they will be prepared and confident in challenging climatic conditions. The learning will be delivered through practical workshops focusing on regenerative pasture management, soil carbon building, species diversity, understanding soil structure and the services a healthy soil can provide.
3	Increasing soil carbon to ameliorate compaction in irrigated soils	Irrigate Cropping Council	Murray Local Land Services and Goulburn Broken CMA	Irrigators are aware that to have healthy soils, there must be adequate aeration through the profile to allow moisture infiltration, plant root penetration and microbial activity. Soil compaction, which limits these characteristics, can be as a result of traffic on irrigation bays or simply due to the action of applying irrigation water. There is considerable interest in improving the structural stability of irrigated soils by improving the soil organic carbon content. Increasing soil organic carbon could be a way to improve water infiltration and remediate compacted subsoils allowing more efficient irrigation. The project intends to investigate two options for improving soil organic carbon. One is to test and demonstrate effective ways of converting crop residues to soil organic carbon via rapid decomposition in situ; the other to insert organic matter into the subsoil (subsoil manuring), aiming to reduce soil compaction and prevent re-occurrence of the compaction. This project will build on knowledge gained from the Beyond SoilCare project that examined soil ripping and amelioration, and the current NLP2 project testing methods of converting crop waste to soil organic carbon. An irrigated trial site will be established in a maize crop in the Shepparton Irrigation Region.

4	Evaluating plant-based opportunities to increase soil carbon in cropping systems	Riverine Plains Inc	Southern Cross University, Charles Sturt University, Soil Cooperative Research Centre for High Performing Soils and Goulburn Broken CMA.	Improving soil carbon using existing practices in the cropping and mixed farming sector is challenging. While there are some established practices for increasing organic matter in cropping soils (e.g. green/brown manuring of pulses or tillage radish, inclusion of pulses in the cropping rotation), there is little evidence on the potential soil carbon gains available within the region. Some new concepts have caught traction in recent years to increase soil health, such as cover cropping, using legumes to intercrop into cereal crops, and 'fertilising stubble' to feed soil biota over summer. The Cooperative Research Centre for High Performing Soils (Soil CRC) has committed to the establishment of a large replicated trial site in north-east Victoria to evaluate a range of soil treatments to improve soil chemical, physical and biological health, established within cropping rotations. A four-year investment by the Goulburn Broken CMA into this project will increase the number of treatments that can be assessed, thus increasing the capacity of this project to add value to other soil carbon-based investments in the region.
5	Assessment and modelling of Soil Carbon profiles in the Hughes Creek catchment	Hughes Creek Catchment Collaborative	University of Melbourne, CSIRO, Southern Cross University	Climate change is now seen as a threat to our farming future. It's been established that an increase in soil carbon is one way to capture CO ₂ from the atmosphere, which will decrease CO ₂ in the atmosphere and increase soil productivity and profitability on farm by up to \$200 per Ha per year. This project will give specific ways to help farmers adapt best practice farming methods to improve farm profitability. The measurement of soil carbon is well established, and this work will be using the methodology developed by the CSIRO and build on previous research, the project will measure soil carbon on farms with different farming practises and histories. The work is extremely relevant with Australia facing record high temperatures and farmers are now looking for adaptive ways to farm.
Priority: Soil acidity				
6	Managing soil acidity and lime decision-making on farm	Goulburn Broken CMA	Agriculture Victoria	This project will look to increase farmers' skills to make decisions around how to monitor and manage soil acidity on their farm. The project will deliver eight workshops with practices including liming, fertiliser selection and use, perennial pastures and grazing management, alternative soil amendments (to lime).
7	Service Provider Forums	Agriculture Victoria	Goulburn Broken CMA	Connecting local service providers to the latest research and information is essential to farmers adopting new and innovative farming practices. This forum provides a platform for service providers to come together to learn and discuss local soils issues and the applicability of new research and farming practices. Participants can link with researchers and other industry experts, as well as learning from each other to improve soil management knowledge.
8	Managing sub-surface irrigation system impacts on soil acidity	Maize Association of Australia	Goulburn Broken CMA	Three Northern Victorian studies showed that long term sub-surface drip irrigation causes significant changes in soil properties, including pH around emitters. A soil scientist suggested that given the soil types in the region, the soil profile should go through a drying cycle to shrink the clay. Soil pits dug in sub-soil drip irrigated fields during 2015 found that

				maize roots were extremely good at penetrating deep into the soil profile. Hence, the impact of maize on drying soils under sub-surface drip irrigation will be further studied through this project. The project will establish a demonstration that will include a treatment with liquid lime to determine the impact on both pH and CEC. The impact of the lime treatment on maize yield will also be assessed.
9	Validating grazing effects on soil nutrients on farms	South West Goulburn Landcare	Goulburn Broken CMA, Agriculture Victoria, Lisa Warn Ag Consulting P/L, Precision Agriculture P/L	Livestock movement influences nutrient distribution in and around paddocks on farms. Where paddocks are not homogenous in landscape and/or soil type, soil sampling at a paddock scale will mask the distribution of nutrients. Applying amendments at an 'average' rate over the paddock as a result is not the most efficient way to address the nutrient requirements in different zones of the paddock. Over 4 years this project will document the grazing management applied to a 40-hectare site in Kilmore East, which is typical of sedimentary hill country farms in the South West Goulburn region. The zones of elevated soil acidity, excessive fertility and nutrient deficiency have already been identified and mapped in the project area. Grazing management will be applied to try to rectify nutrient levels within these zones. The soil across the demonstration site will be re tested and compared to the baseline data. It is anticipated that the project will provide opportunity for landscape generalisations to be developed in similar country so that farmers can engage in improved grazing techniques and therefore improved soil condition.
Priority: Hillslope Erosion				
10	Managing hillslope erosion on farm	Goulburn Broken CMA	Agriculture Victoria	This project will look to increase farmers' skills around setting and monitoring ground cover targets, particularly in hill country, and establishing trigger points for livestock management decisions. It will also look to increase farmers' knowledge of and skills in managing eroded areas on farm. The project will deliver eight workshops around managing erosion, ground cover target setting and monitoring, perennial pastures and grazing management, establishing trigger points for critical decision making, drought preparedness and management response.
11	YouTubes for Healthy Hectares	Strathbogie Ranges Conservation Management Network	Goulburn Broken CMA	This project will produce four video clips based on topics in the Healthy Hectares Booklet and will include soil erosion, land capability & land class fencing, soil types & soil problems. The focus area for these video clips is the Upland Slopes region and they will utilise interviews with experts and experienced farmers. The project's impact on the target audience will be to increase knowledge and confidence and encourage on ground erosion works on private property. The aim is to create useful and long-lasting resources.
12	Inspiring Small Farms to Grow Big Ideas II	Up2Us Landcare Alliance	Goulburn Broken CMA	Small acreage properties are on the rise within the Goulburn Broken catchment with the 'tree changers' phenomenon fuelling it. Small acreage landholders have the capacity to develop effective, sustainable production on their properties but lack the knowledge and capacity for understanding the climatic variables and natural resource base restrictions of the region. For the most part, they understand the need to incorporate efficient management of the natural resource base to effectively manage their land but lack the

				knowledge and capacity to deliver on the intellectual understanding. Up2Us is bringing that knowledge to life through this project. This project will primarily be focussed on Climate Change Adaptation focussing on development of farm demonstrations which will effectively show the farm-scale adaptations required to be productive. Regenerative agriculture/horticulture for small acreage properties will form the principle philosophy for the demonstrations. Included will be monitoring and managing soil capability given the hillslope erosion so prominent in the Mansfield region.
Priority: Native vegetation and biodiversity				
13	Increasing vegetation and biodiversity on farm	Goulburn Broken CMA	Agriculture Victoria	This project will look to increase farmers' knowledge and skills around the value of native vegetation and biodiversity to the farm business and the broader community. The project will deliver three biodiversity workshops with topics including revegetation, deferred grazing strategies, fencing off conservation areas, promoting native pasture species.
14	Farmers Helping Farmers	Victorian No-Till Farmers Association	Nutri-Tech Solutions, Farming Secrets and Goulburn Broken CMA.	The activities that we will undertake in this project will empower farmers by giving them information that they can use to make decisions in their business that will make their farms more resilient and less reliant on synthetic inputs, which in turn will increase profit and production. Presenters include Dr Mary Cole will deliver a two-day workshop on Biological Farming, and knowledge of microscope use will enable farmers to assess and develop their knowledge of biological farming and the importance of soil health and Graeme Sait will improve farmers knowledge how to improve your soils. The demonstration will highlight the use of pollinator strips in crops, we will endeavour to demonstrate that planting to attract beneficial insects can reduce the need for insecticides.
15	Putting our heads together: Collaboration and knowledge sharing across the Catchments	Greta Valley Landcare Group	Gecko CLaN, Glenrowan West Landcare group and Goulburn Broken CMA	Too often we are unaware of what is going on over our neighbours' fence. This project aims to facilitate the sharing of knowledge and information regarding the establishment of vegetation on-farm – the different ways in which this can be done and the successes of some key projects that have been completed in the Goulburn Broken CMA focusing on shade and shelter in the Gecko CLaN area. Increasing vegetation on farms has immediate benefits for agricultural productivity, but also numerous complementary benefits for on-farm and local biodiversity, improvements to water quality and soils and importantly to reduce the impacts of changes in climate over the long-term.
Priority: Climate change adaptation				
16	Showcasing adaptation to climate change	Goulburn Broken CMA	Agriculture Victoria	This project will promote land management practices that effectively and productively adapt to climate change. It will increase knowledge and understanding by farmers of projected climate changes, the associated risks, and management strategies. This project will deliver 10 workshops around practices that may include ground cover target setting and monitoring, perennial pastures and grazing management, establishing trigger points for critical decision making, drought preparedness and management response, water infrastructure budgeting and planning.

17	Integrating Indigenous crops for climate resilient food production systems	Melbourne University – Dookie campus	Melbourne University's Academy of Sport, Health and Education (ASHE), Kaiela Institute, Goulburn Broken CMA	Climate change may impact the type of crops we grow for food as well as the method in which we grow them. Indigenous crops add value to sustain crop biodiversity which is paramount for long-term sustainability of our food production system. Indigenous and aboriginal communities within the Goulburn Broken region are not well represented within the agriculture training or career pathway. Sustainable land management practices will be implementing demonstrations that will be twofold – growing in polytunnels and growing in the field to ascertain the needs of the crops and the ability to maximise production. Limiting the use of fertiliser and chemicals will be integrated in the project design and depending on the needs and types of crops allocated for this demonstration will be implemented. This project is focussing on providing opportunity to engage with the local Aboriginal community in order to trial and grow indigenous crops in a controlled manner to ascertain their effectiveness and nutritional value in the local food market. This project will provide exposure and opportunity for Aboriginal youth to engage in careers within the agriculture sector.
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