

Empowering farmers to meet the soil carbon challenge



North East CMA, VIC

NORTH EAST CMA

The North East Victoria Catchment Management Authority (CMA) region is bounded by the Murray River in the north, the Victorian Alps in the south, the NSW border in the east and the Warby Ranges in the west.

The North East CMA region takes in the local government municipalities of Wodonga, Indigo, Wangaratta, Alpine and Towong, plus parts of Moira and East Gippsland Shires. Approximately 95,000 people live in the region. The main industries in the region are agriculture (dairy, beef, lamb, wool, cropping and horticulture), forest products, tourism, value-added processing industries and manufacturing.

Responsibilities of the whole of the North East CMA include:

- River Health
- Floodplain Management
- Water Quality
- Wetlands
- Environmental Water Reserve
- Permits - Works on Waterways
- Waterwatch
- Land Stewardship - including Sustainable Agriculture and Environmental Management Systems
- Monitoring, Evaluation & Reporting
- *Caring for Our Country* projects including:
Landscape Scale Conservation - Threatened Grassy Woodlands Project and the Soil Carbon Programme

Within the North East CMA Regional Catchment Strategy, the CMA conducts a wide range of activities addressing these responsibilities.

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NORTH EAST
CATCHMENT
MANAGEMENT
AUTHORITY

The North East Victoria Catchment Management Authority (CMA) is running an innovative project to help over 500 farmers improve the soil carbon content of their properties and empowering them with the knowledge to improve production sustainably, whilst meeting catchment environmental goals.

Chris Reid and the Land Stewardship team at the North East CMA recognised a critical gap in the knowledge of many farmers was how to practically manage soil fertility, its structure and the contribution of healthy soil to improved farm production. Assisted by funding from the Federal Government the team developed the *Sustainable Farm Practices - Soil Carbon Programme* to fill this knowledge gap and realise positive environmental outcomes.

In the face of one of the worst droughts on record and falling farm production generally, the team have balanced stakeholder needs with desired environmental outcomes to develop a successful and well-received project. The team is now delivering up to six information activities a month, including field days, forums and workshops. Through these North East CMA is connecting with landholders involved in existing and/or recently completed projects, Landcare groups and networks, industry groups and individuals with an interest in improving their soil organic carbon levels. Participating farmers now have the skills and knowledge to interpret their own soil tests offered by the project and have access to independent agronomy advice on how best to respond – in a sustainable manner.

Managing such a project requires dedication, commitment, and flexibility to address challenges as they arise. The team at the North East CMA demonstrate all these attributes and share how their project came into fruition and is making a difference across the entire catchment



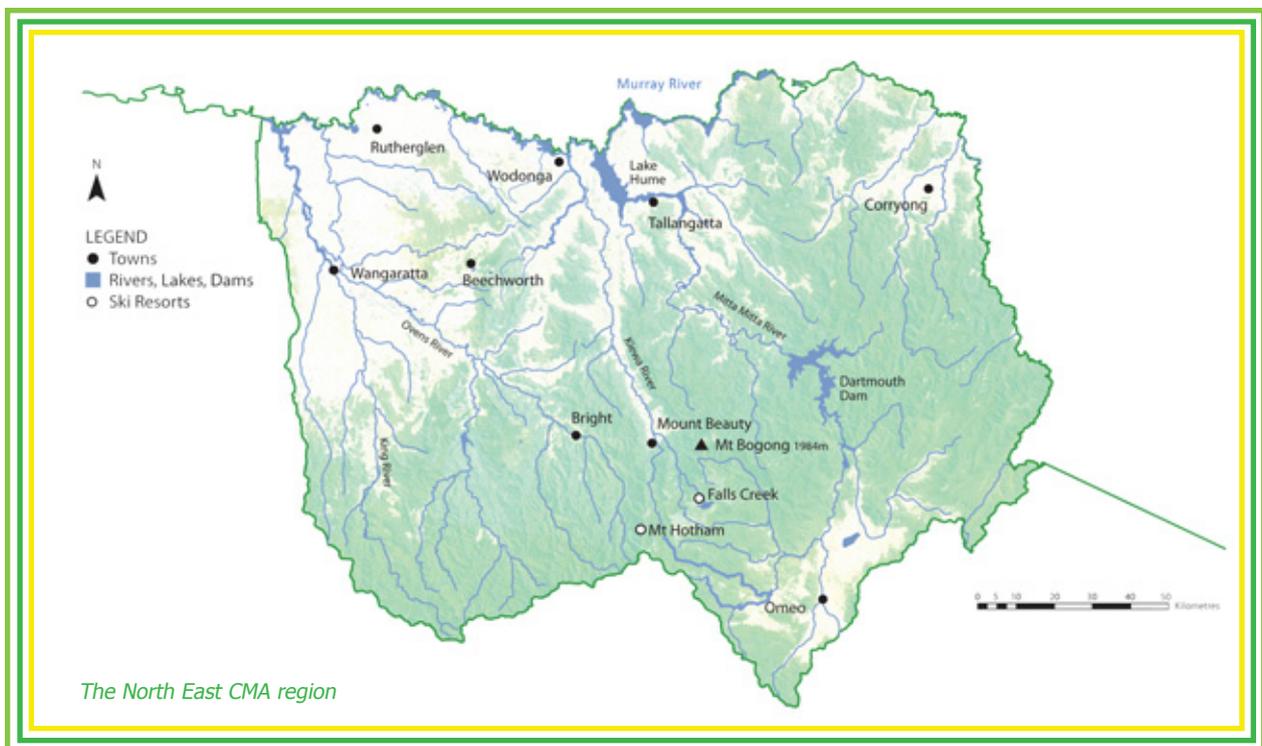
Taking on the Challenge

The North East CMA *Soil Carbon Programme* was developed by Chris Reid and his Land Stewardship team in 2009 to take advantage of potential funding available from the *Caring for Our Country* initiative of the Commonwealth Department of Agriculture, Forestry and Fisheries (DAFF). The Land Stewardship team had built up considerable knowledge from numerous previous projects and they knew what contribution healthy soil could make to production as well as the environmental benefits it delivers. They identified a significant opportunity to build on their own previous work and that already undertaken by some Landcare groups in the region to spread this knowledge to the diverse farming community.

The team were not fully convinced by some of the arguments being aired in support of the economic advantages of mooted pasture-based carbon farming under carbon trading schemes. However, they were convinced, by their own surveys and practical engagement with farmers, of the need for land holders to increase organic soil carbon as part of a strategy of farm landscape regeneration, and, ultimately, for improved production. The team had access to data that showed rates of soil carbon in the region in the 1830s as high as 12% and yet the current figures averaged less than 2%. The potential for improvement was clear.



A critical knowledge gap in understanding soil tests was identified by the NE CMA



It was apparent to the Land Stewardship team that the majority of farmers did not understand the benefits of soil testing and how to interpret their own results. Farmers were therefore inhibited in making choices for strategies for improving soil fertility and structure.

An issue arising from this lack of understanding was the use of fertilisers, what occurs as a result of continued application and the effects on soil nutrition. This was leading to issues including widespread but localised soil acidity problems, aluminium toxicity and grass tetany. Grass tetany is a reaction in livestock caused by magnesium deficiency often resulting from a mis-match of low-magnesium pastures and fertiliser use. In the view of Chris and his team, better education of farmers on understanding soil structure, soil carbon management grazing management and soil fertility would be inherently valuable.

Promoting the idea of improving soil carbon levels in the face of one of the worst droughts on record and falling farm production generally, was going to be a very difficult task. If stakeholders were to be convinced of the advantages of joining in the *Soil Carbon Programme* in such an environment, the possibility of improving production had to be demonstrable. The other significant part of the equation was that improving carbon levels was potentially a slow process. Results would not be obvious for some time into the future. The potential for increasing farm production therefore had to be clearly linked to the initiatives for improving soil carbon levels.

Chris and his team worked to identify what would help motivate farmers to join the *Soil Carbon Programme* in this challenging environment. Chris says they decided to offer a benefit for participants up front, in the form of, "Soil testing that produced results that farmers could understand and from which they and their agronomists could make sound decisions on soil fertility and management".

Given this starting point, the team then developed the concept further to include independent agronomy workshops to explain to farmers how to read soil analysis and to provide guidance for further decision making. They would offer access for farmers to an agronomist of their own choosing from a panel of eight to provide follow-on support in the workshop program. The team would also seek out speakers from across Australia - and even international experts - who had practical experience in building soil health, with a focus on carbon, to pass on their experiences to land managers across the catchment.



Field days provide a valuable opportunity for information sharing and maintaining engagement

Project Objectives and Activities

Chris defines the key objective of the program as, "To achieve long term and continuing change to farm management practices that will raise the capacity of farmers to improve the soil carbon content of their properties in the long term".

Overall, the project activities developed were quite straightforward. The CMA team determined that it would pay for soil testing for the participating landholders; provide free agronomic advice to these landholders on the soil test outcomes; run field days, workshops and forums on soil organic carbon and related subjects; and deliver free eFarmer training through adult education approaches. A final soil test would be provided at the end of the program to measure improvements in soil health.

In turn, the project would require specific actions from participating landholders:

- Committing to changing their management practices for the term of the project on a nominated area of their property.



- ◆ Agreeing to participate in farm planning and soil management training and information sessions, in which they would have access to free soil testing and agronomic advice.
- ◆ Selecting an agronomist from a panel nominated by North East CMA who would provide up to four free on-site advice sessions.
- ◆ Attending free eFarmer workshops conducted by North East CMA, for which the project team would set up an eFarmer help desk in support.

eFarmer is a web-based application which supports the capture, viewing and sharing Natural Resource Management information across farms, landscapes and catchments. The web application, together with a simple matrix, informs private land managers of the natural resource management priorities of the CMA within which they reside and allows them to identify proposed and voluntarily implemented activities on their properties that may contribute to the achievement of CMA catchment wide targets.

SOIL CARBON PROGRAMME TARGETS

- 2800** land managers would improve their natural resource management knowledge.
- 1500** landholders would begin using improved soil management practices.
- 1300** land managers would attend soil management forums.
- 500** land managers would commit to the whole project and attend farm planning and soil management training and conduct prescribed management practices on a nominate area of their land. These would be the key stakeholders of the project and its champions.

Planning Process

The majority of the planning for the project was conducted as part of compiling the submission for DAFF funding. Suzanne Johnstone from the team explains that the North East CMA team found developing the Program Logic document, required for an application for DAFF funding, was a useful methodology for scoping the project. The Program Logic has since provided the basic guidance for all further project documentation.

Another key document that was developed during the planning phase was the Community Engagement Plan. This Plan identified stakeholders and set out strategies for dealing with the issues that their research had shown were the keys to the success of the project. Identified communication activities included actions such as attending meetings and discussing the project with community groups, mainly local Landcare groups, and a whole-of-catchment mail out using tailored postcards supplying project information and contacts.

The team identified its stakeholders for the *Soil Carbon Programme* to include:

- ◆ Landholders of the CMA region
- ◆ Landcare groups of the CMA region
- ◆ Local industry supporting farming activities
- ◆ Conservation management networks
- ◆ CMA staff

The landholders of the region were the communication priority. Key messages for the communications were the 'no strings' soil testing, the independent agronomy advice, the use of the eFarmer planning tool and the field services provided for training and education. The communication activities would also be subject to the continuous improvement based on documented stakeholder feedback.

Credibility at all stages of the project was identified as essential. All of the stakeholders needed to have trust in the CMA team and in what the project could deliver. The farmers, in particular, needed to have trust in the information they received from the CMA team, the soil testing reports and in their chosen agronomist.

The team was certain that, only when this mutual trust and credibility was established, could they expect a commitment from farmers to the project and its outcomes.

Obtaining Funding

In developing their grant funding proposal, the project team identified three streams that required funding for the *Soil Carbon Programme*:

- ◆ soil testing
- ◆ agronomists and associated training and information delivery
- ◆ staffing of the project

The CMA Board reviewed and supported the soil carbon initiative proposal and recommended it to DAFF as one of a number of North East CMA proposals recommended for funding. DAFF agreed to fund the *Soil Carbon Programme* to \$2.2 million over four years, running from July 2009 to June 2013. The allocated funding supported all the proposed soil carbon activities as well as salaries for 3.5 full-time equivalent (FTE) staff positions.

Risks and Challenges

Early in the planning phase, the project team expected that continuous risk and impediment management would form a large part of project management. The team identified risks to the project and developed strategies to manage them.

One of the major risks identified was the potential for staff turnover, and thus a loss of competencies from the project, as project funding was expended and staff sought other secure employment. To address this, the management team set to identifying opportunities for future projects and associated funding to ensure ongoing tenure and retain and use existing competencies.

Another significant risk identified was the difficulty of engaging 500 landowners in the program and keeping them committed for the four year duration. The team determined that maintaining ongoing communication and ensuring continued engagement through active participation in regular events would be the best way to manage this risk.

The planning phase also identified a number of likely impediments to the success of the project.

Being conducted at the height of a major and long term drought, many of the landholders would be focussed on surviving the drought and would not necessarily be interested in improving soil structure, carbon content and fertility. Additionally, many landholders were accustomed to dealing with a number of organisations, entities and



Learning to interpret soil tests helped farmers develop sustainable solutions for improving their soil carbon

individuals who were committed to traditional farming practices. Farmers had long followed their advice and support and may, therefore, be reluctant to abandon comfort zones and begin something new.

As part of their impediment management program, Chris and his team decided that their impediment management approach would include:

- ◆ Soil testing for the 500 participants undertaken by a trusted scientific entity that was used in a previous large scale Landcare soil testing project.
- ◆ Free explanations from experts on how to interpret soil testing results.
- ◆ Providing free advice to farmers from a CMA-identified panel of independent agronomists.
- ◆ Conducting field days and seminars with guest presenters suggested by farmers who were not committed to any particular method of farming or landscape regeneration to the exclusion of other ideas.
- ◆ Ensuring that all advice came from independent sources and was not delivered by local, state or commonwealth agencies.
- ◆ Ensuring that the project team members and the agronomists listened to the landholders and reported back their comments, ideas and suggestions.



Managing the Project

Although the communications activities were relatively unsophisticated, Suzanne explains, "We were swamped with Expressions of Interest, to the extent that we had a backlog that we were having trouble dealing with". Overall, 505 landholders have been selected to participate in the initial soils testing component of the project, from a range of farming enterprises including grazing, cropping, horticulture, viticulture, dairy and mixed enterprises.

As the project got underway, North East CMA organised and funded the initial soil sampling, comprising 22 soil cores extracted from 2 x 100m transects from each property. Soil was subdivided into four depth categories between 0-30cm and pooled prior to laboratory analysis for soil carbon as well as other chemical and physical soil characteristics. Group on-farm soil advice from their nominated panel of agronomists through field days and forums was also funded and organised. Landcare groups and networks, industry programs with similar focus, and individuals with an interest in improving their soil carbon management were identified and engaged. Regular newsletters and soil improvement information sheets were distributed to maintain interest within in the project.

The project was fortunate in that the staff carried over from a previous project had a broad range of natural resource management and agricultural skills and also had the advantage of tapping into existing Landcare coordinators and project managers that had great field and community experience. The team built on the previous experience and took on new skills. Chris notes, "Training in other areas was conducted, such as use of the soil sampling machine and preparing a formal process and following it for consistency of data and for reducing sampling error".

Chris and his team manage from the project baseline plan and the original brief. The project is managed across three streams into which individual components have been grouped.

1. **Soil Testing** – soil testing and seminars for interpreting results.
2. **Training and Education** – agronomy sessions, field days, seminars and the eFarmer training.
3. **Quality Management** – post-activity surveys, eFarmer help desk feedback and ongoing communications including CMA Internet site updates.

Continuous Improvement

The Quality Management stream of the project aims to ensure continuous improvement of activities and information resources. Anonymous post-activity surveys administered to review training outcomes and take-up provide an opportunity for respondents to comment on content, speakers, activities and to suggest changes and improvements. This information is analysed by the CMA team and changes made to programs and activities according to need and available budget.

The CMA team depends on these anonymous surveys to check achievement of objectives and targets and to provide input to improvement of future activities.

The information from surveys is also vetted and commented upon by the agronomists participating in the program and compared with anecdotal information from North East CMA staff.

Feedback from field days held in February 2012 showed that all attendees answered 'yes' to the question "*Has your knowledge of Soil Health improved from this session?*", each marking five out of five that they had "learned a lot".

In response to the question "*Having participated in the Soil Carbon Programme, do you consider that your approach to farm management practices may change to incorporate some more sustainable practices?*" those that answered 'yes' also provided comments of the changes they may make including:

- "Less emphasis on spray and more emphasis on management"
- "Use less chemical, rely on biodiversity"
- "Improve grazing management"
- "Look at a longer management cycle to grazing"
- "Understanding your landscape"
- "What weeds are telling me about my management"
- "Ground cover management is now my top priority"
- "I will manage to increase local biodiversity"
- "Floodplain management"
- "Maintaining water in the soil profile and using carbon to do this"

Suzanne Johnstone, as the lead in the eFarmer training, provides information based on her help desk role and hits on the eFarmer Internet site.

All the information gathered contributes to the continuous improvement of project activities and content and targeting of supporting publications. The project team regularly reviews activities and outcomes for opportunities to implement changes to the project and activities.

Lessons Learned

The well developed continuous improvement program ensures that any shortfall in expectations, of which there have been very few, becomes the basis for improvement. For example, when the manual collection and storing of information became onerous, a database was established. The database continues to be developed and its numerous functions are major contributors to efficiency in the project and have reduced resource overheads by the equivalent of half the workload of one full time staff member.

The hand auger sampling was an idea that did not stand up to early optimistic expectations and was soon abandoned with the arrival of a suitable mechanical option.



NE CMA staff were trained to use the soil sampling machinery

“In the first instance, we had a three months wait for suitable soil sampling machinery and undertook a program of manual sampling in rock hard, drought affected soils. We found that we did not have the resources to continue with the manual taking of soil in accordance with our planned timetable and, in any event, from an OH&S viewpoint, manual sampling was not a good idea. However, suitable machinery was eventually sourced and staff trained to use the machinery and to follow a constructed soil sampling process.”

Initial team grouping of participants did not always work out in all instances. There was a need to move some participants to other groups as their interests were not well aligned with the majority of the participants in their area.

Similarly, choice of agronomists by some participants did not align well with requirements. “Two to three of the agronomists were exchanged by some participants for others – we always planned to offer choices to participants – even offering them to other groups such as similar enterprises, independent of their geographically location. This worked well.”

Other key lessons from the project include the importance of:

- ◆ Establishing credibility through empowerment of stakeholders.
- ◆ Maintaining continuing contact with stakeholders and responding positively to suggestions and feedback.
- ◆ Continuous improvement of project activities and outcomes based on stakeholder feedback, such as:
 - ◆ using independent consultants;
 - ◆ adaptive management; and
 - ◆ initially offering an obvious benefit to project participants (in this case, soil tests and agronomic sessions).

In addition, to align with the expectations of landholders, it was essential for success that the program focussed broadly on soil health, not carbon sequestration alone, but to ensure that the program did not exclude information on carbon sequestration.



Significant Outcomes to Date

Some interesting insights were provided by one of the projects participants, John Paterson, a beef producer in the Mitta Mitta Valley. John and his wife 'retired' to the area after many decades of dairy farming in the Cobram Area. Their approach to farming over that time might be considered conventional and John recognised their reliance on superphosphate and chemical inputs to keep the pastures growing.

Over recent years, with the costs of these inputs continuing to increase, John began to ponder alternatives. The *Soil Carbon Programme* seemed to offer an insight on other management options and the free soil testing and access to alternative agronomists were appealing. He 'put his hand up' and has enjoyed the experience immensely, particularly in joining others from the district and hearing their experiences.

John has learned much about soil health including getting mineral balances right, the beneficial work of dung beetles, the ability for native and clover pasture species to re-emerge and the positive effects that improved grazing methods can have on the enterprise. He has experimented with rock phosphates which support the soil biology and the pasture results are readily apparent when compared to adjacent untreated paddocks. The program has exposed John to new possibilities in grazing and he says he will, "Keep giving it all a go and see what happens".

So far, more than the target number of landholders have become involved in the farm planning/soil management training, have accessed free soil testing and agronomic advice and agreed to change their management practices on a nominated area of their property.

Suzanne reports, "The offer of free soil tests with an obligation to attend four free soil agronomy sessions with a soil specialist of their choosing attracted 505 land holders - covering a significant area of the north east region. The attendance at each of the sessions has indicated the strong interest in soils in general and soil organic carbon in particular".

The combined area of all the properties involved in the *Soil Carbon Programme* is over 116,000 hectares, noting that not all of this area is subject to changed soil management practices at this stage.

"The overall objectives of the project have been largely met due to the need and interest of the region's landholders to improve their productive resource (soil) due to the years



Improved pasture on the property of Soil Carbon Programme participant, John Paterson

of degradation through general inattention and drought; and genuine interest in improving their soil health for long term sustainability."

The training and education activities have been very successful and high demand has meant that, in some cases, there have been up to six seminars/field days in a single month to different locations in the North East CMA region.

Highlighting some of the significant outcomes of the program so far, Suzanne observes, "New people keep coming to our events. Involving local people in local events empowers them. Empowered people are easier to convince... and the cost is minimal. We now have over 2000 landholders on our database from attendance at our events!"

The team also points out that credibility is the key, "Farmers can see that we respond to their suggestions and that there are no strings attached".

The anonymous exit surveys conducted by the team have shown that the field days on farms have developed promoters and champions of change, who, in themselves are not usually promoters of new ideas.

While noting that it is too early to point to dramatic changes in soil carbon levels where changed farming practices are in place, the team are confident that participants can show improvements in soil structure, pasture cover and stocking rates. Analysis from the results of the initial round of soil tests can be found on the North East CMA Internet site: <http://www.necma.vic.gov.au/OurPrograms/LandStewardship/SoilCarbonProgramme.asp>.

As an indicator of the success of the program, the team point out that no participants have really separated from the *Soil Carbon Programme* and, indeed, some from the wider population have sought to join.

“From a provider of integrated catchment management programs, the delivery and uptake of information from this project has been very successful. We will be going back to all 505 landholders in the last year of the project to undertake soil carbon testing and interview each landholder to understand what changes they have adopted as a result of attending the information sessions and the general heightened level of information that has been made available through this program. The data base of information collected as part of this project through interviews and soil tests will be assessed to understand the health of the regions’ farming soils and opportunities to improve the environmental service the soil provides.”

Interim reports are demonstrating that, as a result of being involved in the *Soil Carbon Programme*, many participants are adopting agricultural and management practice changes across their whole property, not just on the sites committed to the soil testing activities. Changes already adopted include:

- ◆ Increasing paddock numbers and transition to rotational grazing management
- ◆ Improved ground cover maintenance
- ◆ Promotion or sowing of perennial species
- ◆ Maximising species diversity in pasture
- ◆ Increased stubble retention
- ◆ Changes to fertilisers used, such as seaweed and trace element application rather than only annual NPK application
- ◆ Application of more precise Calcium products, such as sulphur/calcium/magnesium mixes

Once the final interviews and soil testing are complete a thorough assessment of the *Soil Carbon Programme* will be undertaken.

Chris and the team see a clear need to communicate their successes beyond the farming community. The region includes some major urban population centres, in



Interest in the North East CMA Soil Carbon Programme has been ongoing

particular Wodonga (and nearby Albury) and Wangaratta, that are home to schools, community groups and business and agricultural production organisations and also industrial entities that support agriculture. In addition, the team has identified a number of complementary programs being run by Landcare that could provide opportunities for mutual benefit in widening awareness of the economic and environmental benefits of farm landscape regeneration. These areas will be addressed through the regional media as an enhancement to the existing stakeholder engagement activities.

As another aspect of soil carbon improvement, the project team are involved in, is an in house experimental program which is using willows extracted from stream regeneration projects to produce bio-char in a portable charcoal furnace. Further bio-char funding has been received by the *Soil Carbon Programme*, to implement field trials in bio-char and test its value for local agricultural enterprises.

Chris and the team believe that the momentum created by the *Soil Carbon Programme* could well be the starting point of a further projects that deal with the integration of soil hydrology, soil fertility and vegetation in triple bottom line outcome for CMA landholders. Project of this nature could logically build on the considerable amount of data collected a part of the *Soil Carbon Programme*.

Perhaps the success of the project to date can be best summed up by Suzanne Johnstone, who comments, “This has been the most rewarding project in the 15 years I have been involved in NRM activities... there have been more ‘light-bulb’ moments associated with our work with farmers than I can ever remember”.



“New people keep coming to our events. Involving local people in local events empowers them. Empowered people are easier to convince... and the cost is minimal.”

SHARING THE SUCCESS

This project is achieving catchment-wide change in knowledge of how to build healthy soils, using a range of methods that best suit the individual farmers. This closing of a critical knowledge gap, supported by practical advice and action on the ground, provides a positive example that others could follow. With funding of \$2.2 million over four years, over 500 farmers are actively involved and up to 1500 are beginning to use improved soil management practices. This equates to around \$1500 investment in each farmer over a four-year period.

The project demonstrates a very cost efficient way of encouraging change in farming practice. If extended across Australia's 53 other CMA/NRM organisations it would realise 25,000 farmers actively changing their soil health for the better, together with another 50,000 looking to make a change.

Through an expanded communications program, the results can be explained to not only land managers but also to local government, businesses and schools to provide wider community awareness of the importance of soil health and the methods of achieving improved fertility.

The knowledge gained and then successfully applied through such a program could also be recognised through the awarding of a formal qualification through local training providers.

This case study is an excerpt from the Soils for Life report:

Innovations for Regenerative Landscape Management: *Case studies of regenerative land management in practice*

REPORT SUMMARY

The Need for Change

Despite good practices of many of our land managers and farmers linked to some good science, the realities of an increasingly arid and degraded landscape will impact significantly not only on the productivity and viability of agricultural enterprises, but also on the health of our environment and the wellbeing of every Australian.

Landscape degradation is an issue of national and global concern. Landscape management practices including, but not limited to agriculture, forestry and fire have caused significant damage and in the process have altered the earth's natural biosystem. Consequently the precious resources of soil and water necessary to sustain life are being lost at unsustainable rates.

Unprecedented global challenges are arising in the face of this massive degradation of the landscape.

Soil erosion due to traditional agriculture is occurring at a rate between 10 and 100 times faster than the soil's natural formation process (pedogenesis)^{1,2}. Healthy soils are necessary to provide sufficient amounts of food with quality nutrition and fibre to meet global requirements.

Three billion people globally already have inadequate water and sanitation. It is assessed that 80% more water will need to be accessed by 2050 to feed the potential global population of more than nine billion³. Unless all limited soil and fresh water resources are understood and wisely managed, we are at risk of escalating social disruption and regional instability.

Even with its significant land area, Australia is not immune to the consequences of landscape degradation and increasing future needs. The realities of an increasingly arid and degraded landscape are being experienced across the country. These include:

- increasing acidification, particularly in the south-east;
- declining soil health, caused by the loss of soil organic carbon (SOC);
- erosion;
- severe salinity;
- diminishing river flows;
- high evaporation and runoff rates;
- decreasing availability of groundwater; and
- reduced resilience to impacts of extreme and variable weather events such as drought, flood and fire.

The current state of the Australian natural landscape is further challenged by stresses from our changing climate, unsustainable management practices (such as reliance on high energy inputs), increased mining activity and urban expansion.

The national and global challenges being faced are interrelated and can be best met through a comprehensive coordinated approach focused on improved regenerative environmental management practices.

Landscape Regeneration for our Future

The key process drivers for landscape regeneration are **soil**, **water** and **vegetation**. Together in a natural system, supported by a constant flow of solar energy, these provide a regenerative cycle.

By restoring natural systems through improving landscape management practices, we can maximise water use efficiency, improve soil health, nutrient cycling and biodiversity of vegetation. A properly structured soil, with good levels of SOC, allows greater infiltration and retention of rainfall. Every gram of carbon in the soil can retain up to eight grams of water.

Currently, approximately 50% of rainfall on the Australian landscape is lost to evaporation due to poor soil structure and insufficient groundcover. By improving soil structure – particularly carbon – through increasing organic matter in the soil, we will be able to better capture and retain any rain that falls, making it available to plants for longer.

Through revegetation, groundcover is improved, and subsequently so is the quality of the soil, enhancing water infiltration. In turn, improved soil health and efficiency in water use contributes directly to the ability to support a biodiversity of vegetation and species.

If properly supported, this regenerative cycle can continue to sustain and improve the natural resource base and therefore landscape resilience and productivity.

Restoring these natural cycles and becoming more efficient in the use of natural resources is fundamental to the provision of sufficient food, fibre and water for a growing population. Business as usual is neither viable nor sustainable. Effective practical policies and actions are needed now.

Landscape Regeneration in Action

Innovative farmers are using high performance regenerative landscape management methods and fighting the trend of continued degradation of the landscape with its heavy reliance on external inputs. They are demonstrating sustainable, regenerative practices on their land. With relevant policies and incentives these practices could be extended successfully and quickly to involve a significant number of Australia's 135,000 farmers. Whilst there are always opportunities to learn more, enough is already known to take action now.



Soils for Life has documented some of these regenerative practices in 19 case studies across a range of locations and land-use types. Experiences shared by the 17 innovative farmers and two community organisations in the Soils for Life case studies demonstrate successful action being taken to restore the landscape. Due to the interrelated nature of soil, water and vegetation, benefits can be experienced across all process drivers regardless of the particular area of focus.

The Soils for Life case studies describe a range of techniques being used to obtain positive, regenerative outcomes, including:

- Applying organic composts, fertilisers and bio-amendments;
- Encouraging natural biological cycles and nutrient transfer;
- Implementing time-controlled planned grazing;
- Using grazing management and animal impact as farm and ecosystem development tools;
- Retaining stubble or performing biological stubble breakdown;
- Constructing interventions in the landscape or waterways to slow or capture the flow of water;
- Fencing off water ways and implementing water reticulation for stock;
- Investing in revegetation;
- Pasture cropping;
- Direct-drill cropping and pasture sowing;
- Changing crop rotations;
- Incorporating green manure or under-sowing of legumes;
- Managing for increasing species diversity;
- Controlling weeds through increased competition by desirable species;
- Reducing or ceasing synthetic chemical inputs; and
- Integrating enterprises.

PRINCIPLES FOR REGENERATIVE LANDSCAPE MANAGEMENT

Our case studies show that many different techniques can be applied to regenerate the landscape. Farmers and land managers commonly tailor a variety of methods to their own landscape and personal preferences. There is no single solution to landscape regeneration.

The following principles consistently emerge as underlying their regenerative practices – regardless of location or enterprise. These can be applied by other landholders as a basis for their own regeneration journey.

- Improve the structure of soil, through enhancing organic matter content
- Use and conserve rain where it falls
- Manage holistically
- Care about the land as a resource
- Commit to education and constant learning
- Search out communities of interest for help and advice
- Work on best land and extend from there
- Strive for maximum groundcover, for the majority of the time
- Manage times of plenty for times of shortage
- Reduce reliance on off-farm inputs
- Observe, measure and respond

Notes:

- 1 United Nations Environment Program, 2012, UNEP Year Book 2012: Emerging issues in our global environment, <http://www.unep.org/yearbook/2012>
- 2 Pimentel, D., 2006, 'Soil erosion: A food and environmental threat.' Environment Development and Sustainability, 8, pp119-137
- 3 Barlow, M., 2007, Blue Covenant: The Global Water Crisis and the Coming Battle for the Right to Water, McClelland & Stewart

CASE STUDY 18 - NORTH EAST CATCHMENT MANAGEMENT AUTHORITY VIC

Other case studies and the full *Soils for Life* report are available at: www.soilsforlife.org.au.

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