

Don't measure success by the size of your herd



JILLAMATONG

Farm Facts

5km south-west of Braidwood,
NSW Southern Tablelands

Enterprise: Cattle. Cottage Industries

Beef cattle raising, agistment and trading; native grass seed, truffles, garlic and yabbies

Property Size: 453 hectares

Average Annual Rainfall: 719 mm

Elevation: 650-750 m

Motivation for Change

- ◆ Learning about Holistic Management

Innovations

- ◆ A number of complementary approaches founded on Holistic Management thinking
- ◆ Time-controlled rotational grazing within carrying capacity and designed to facilitate nutrient movement
- ◆ Replacing ploughing with surface cultivation and direct sowing
- ◆ Natural Sequence Farming approach to Watercourse management
- ◆ Use of organic wastes as fertilisers
- ◆ Innovations commenced: 1994

Key Results

- ◆ Productivity increase from 1.73 to 1.13 hectares per cow
- ◆ Total profit per hectare per 100mm of rain more than 10 times greater than local average
- ◆ Cash flow stability
- ◆ Permanently flowing waterways
- ◆ Year-long green perennial pastures



From struggling farmer to award winner, Martin Royds, along with his partner Trish Solomon, have re-defined their own meaning of success on the land.

During the 1982 drought, Martin Royds watched in horror as tonnes of topsoil blew off hillsides and coated fences. Gully erosion was rampant, and when the rains eventually did come, any remaining topsoil and organic matter was stripped and washed away.

Over the years since, Martin Royds and Trish Solomon have turned their property around, battling advocates of traditional methods and regulatory constraints to create an agricultural enterprise example – and gaining well-earned recognition in the process.

Holistic management has helped deliver a property that is still able to fatten cattle during drought periods when neighbours are unable to run stock. Diversification has also enabled the maintenance of cash flow through other industries such as harvesting native grass seed, truffles, garlic and yabbies.

Martin has won or been nominated for a range of awards, including winning the award for 'Carbon Cocky for East of the Divide' in 2007. He is tireless in his thirst for gaining and sharing knowledge, attending or presenting at conferences and seminars across the country and maintaining membership with a number of organisations and committees.

Martin and Trish believe that there is a real divide between the farm and non-farm communities and a lack of understanding of the role of each in our present society. They want to set an example for those in towns and cities that farmers can produce nutrient rich food economically whilst also improving the environmental aspects of the landscape. Their story is one of success on many levels – social, financial and environmental.

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The Way It Was

The Royds family settled in the Braidwood area in the first half of the 19th century and Martin's maternal grandparents acquired the Jillamatong property in 1952. Martin managed Jillamatong jointly with others in the family from 1985 and took over sole responsibility in 1996.

Jillamatong is about five kilometres south-west of the town of Braidwood on the southern tablelands of New South Wales. It is within the Shoalhaven River catchment, which is part of Sydney's water supply and managed by Sydney Water and the Southern Rivers Catchment Management Authority (CMA). Control is with the landholder, they manage water values.

The property comprises 453 hectares of moderate slopes and flats with an elevation ranging from 650 to 750 metres above sea level. Rainfall averages 719mm but has ranged from a low of 302mm in 1982 to 1250mm in 1959.



Jillamatong

Soils are moderately to well-drained yellow podsols and are often acid leached and infertile on the slopes with poorly drained black earths around the drainage lines. Soil samples have been collected since 1959 and showed that available phosphorus levels were very low, ranging from nil to a maximum of less than five parts per million (ppm). Soils were moderately acidic with a pH ranging from 6.1 to 5.2. Superphosphate has been routinely applied to help establish introduced grasses and clovers. By 1991 the pH had declined to 4.4 but available phosphorus levels had risen to 13ppm.

Prior to cultivation, the landscape consisted of an open grassy woodland with a native pasture of weeping grass (*Microlaena stipoides*), kangaroo grass (*Themeda triandra*), *Danthonia* species, and associated forbs and herbs. Manna gum (*Eucalyptus viminalis*) was scattered on the ridges while bogs and a chain of ponds with swamp gums (*Eucalyptus ovata*) and snow gums (*Eucalyptus pauciflora*) were common in the lower areas.

Previous management involved ploughing paddocks and sowing three introduced grasses and two clovers after first eliminating previous ground cover with herbicide. In 1991, spraying with various chemicals was intensified to try to establish five introduced grasses, three clovers and two forbs by direct sowing. Monocultures of wheat and oats were used mainly as a break crop to aid the re-sowing of pasture. The survival of rye grass and clovers was used as a bio-assay of when a paddock needed re-sowing.

These soil and management practices resulted in an abundance of weeds including three types of thistles, carrot weed (*Cotula australis*), sorrel (*Acetosella vulgaris*), rat's tail fescue (*Vulpia myuros*), Paterson's curse (*Echium plantagineum*) and serrated tussock (*Nassella trichotoma*). Herbicides were used to try to control these. Martin recalls, "Flat weeds were sprayed with MCPA and 2-4D amine. Paddocks were poisoned at each re-sowing between 1990 and 1995 with Roundup. Most paddock timbers were pushed up and burnt to reduce rabbit middens and increase the area for pasture, while rabbits were poisoned and trapped."

The paddocks were set stocked until the early 1990s. Sheep were drenched every six weeks with a constant watch for fly outbreaks and other problems. Cattle were also drenched regularly.

Stock water was from surface dams and free access to ponds in the erosion gully running through the property. There were no permanent waterways on Jillamatong.

Different water management strategies were applied in the past, with the NSW Soil Conservation Service involved in the 1960s in establishing a series of contour drains leading to dams the overflow from which was then piped to the bottom of the erosion gully. Water was seen as a problem to be drained away as quickly as possible.

Martin recalls, "There was extensive erosion with a series of headwall cuts working their way up the central erosion gully to a depth of over four metres".

Financially, environmentally and socially this way of farming was failing.

Pastures lasted five to seven years, much less than the ten to twelve years needed to recoup their cost of establishment.

Sheet and gully erosion were rampant and salt scalds were appearing. The major erosion gully was incised a metre at each headwall cut.

There were few trees left for shade and shelter for stock or pasture and habitat for any other life. The surviving trees were dying. In cold windy weather stock suffered.

Due largely to set stocking and overgrazing 10 to 15 centimetres of topsoil blew off entire hillsides during the drought of 1982. The only pastures that survived and regrew were the native pastures.

As Martin describes, "Many of my farming colleagues felt their land was being taken from under their feet, their backs were to the wall and they were constantly fighting for a fair price for their produce or against environmental catastrophes and the constant onslaught of weeds and regulations."

"The seemingly endless battle with weeds, serrated tussock in particular, was becoming a major problem. Many paddocks were so thick with thistle that we had to slash tracks to find and get stock out of paddocks. Wool quality was affected." Farming was hard.



The floodplains on Jillamatong have been restored

Making Changes

Martin notes, "I had always set out with the goal to question the ways we farm and had been trialling different ideas from the early 1980s". The major catalyst for change on Jillamatong however, was attending a Dr Stan Parsons and Terry McCosker talk on holistic management in 1994.

This reinforced the need to focus on building healthy soil, pasture and water cycles. In the past the focus had been on stock numbers and how to fight weeds and pests.

Implementation of some changes required a complete transformation in ways of thinking. Martin says, "We started setting goals that incorporated the triple bottom line. Whole farm management for us meant including the bank managers and other people involved in the business. This included consulting and engaging with Landcare, CMAs, government agencies, and political decision makers, together with innovative thinkers in the agricultural, environmental and educational fields".

"We initially implemented tree plantings, changed fencing designs, off stream water points, soil biology enhancement and fertiliser techniques, assisted by grants from Landcare and the CMA."

The first wagon-wheel fencing structure was built in 1994, providing smaller paddocks meeting at a central watering point. Sheep and cattle were grouped into one mob and rotated around the paddocks so that pastures could be rested.

Martin continued doing courses on soils, pasture identification and farm management systems and gradually changed practices. "Initially I stopped deep ploughing and developed a skimming and direct sowing pasture establishment technique." Martin says, "In 1995 I realised I was poisoning myself and the landscape via my herbicide use and weed control and have changed to a chemical free property since".

Martin constructively questioned every management decision involving the whole farm team.

However peer group pressure from the traditional views amongst farmers was strong, including that success is measured by the size of your herd. "Some farmers look for ways to increase their herd size irrespective of the long-term effects on pasture and soil quality. When the low rainfall periods come, pastures are over-grazed and hay bought or cattle agisted. This approach inevitably led to cycles of boom and bust, and consequent long-term land degradation."



“I had to learn to laugh with critics and be humble and accept that I have made mistakes along the way.”

Of course with change come related challenges, and Martin and Trish had to deal with their fair share.

“There was peer pressure from a lot of my farming colleagues that I was going against what our forefathers had done.

My father felt that I was accusing him of doing the wrong thing.” At other times, “Neighbours have felt that we were ‘stealing their water’. How else could I have green grass when they didn’t?”

Authorities tried to impose different views. The NSW Office of Water questioned the water slowing and erosion control techniques within the gully and Council Weed Inspectors challenged some of the methods of weed control, trying to insist on chemical solutions. The CMA and Landcare wanted to see total stock exclusion from waterways.

The management of riparian areas are now subject to regulatory constraints applied by state government and CMAs. Martin notes, “These new constraints, aimed at water conservation and land protection at a catchment level, can restrict the ability of landowners to apply erosion control methods on third order drainage lines and below. The traditional approach to deal with gully erosion has been to build large concrete structures and to channel flows around problem areas. That approach accelerates water movement off the farm, rather than encouraging infiltration, water conservation and efficient water use.”

Challenges such as these were resolved through continued dialogue, inviting agencies and decision makers to field days and tours, detailed monitoring and providing evidence of the success of the programs. Education has played a significant part. Leading innovators in particular fields were often introduced to the relevant authorities to talk about contested issues such as the role of plant succession or better understanding local water cycles.

In dealing with the many challenges of implementing change, Martin says, “I had to learn to laugh with critics and be humble and accept that I have made mistakes along the way.”

The Way It Is Now

The holistic approach adopted by Martin and Trish was founded on the goal of developing a farming system that is economically, environmentally and socially regenerative. It was important for Martin to acknowledge that management decisions caused the erosion, weeds, and economic problems and that only by changing these management decisions could regenerative processes be aided to achieve the desired positive outcomes.

Stock Management

Consistent with holistic management principles, planned rotational grazing was introduced across the entire property, requiring fencing into some 50 paddocks. All sheep and cattle were combined into one mob. Initially, a ‘wagon wheel’ paddock configuration that separated valley floors from slopes and ridges was implemented. The preferred layout has since changed to allow cattle to graze from valley floors to ridges at all times

Martin describes why changes were made, “Initially stock were managed in a rotational grazing system with wagon wheels and paddocks fenced to landscape categories, i.e. hilltops, slope and floodplain. We have now changed this so that stock can take fertility up the slope. We need to realise that the stock are more in tune with knowing what different feeds they might need on a daily basis.”

“Hence the new fencing layout allows stock to have access to the chain of ponds and then run up the slope to timbered hilltops. This is better for the stock, they can mix their feed during the day from green to different forbs and drier grasses and then sit in the shade at the top of the hill to ruminate, manuring the whole slope to increase its soil fertility.”



The fencing layout allows stock to transfer nutrients from boggy floodplains to timbered hilltops

"If pastures are not allowing stock to improve then stock numbers are reduced, if necessary to nil."

partially grazed to let them regenerate quickly, while the less palatable grasses will be trampled or left. The aim is for the pasture composition to evolve towards a predominance of more palatable species."

Cattle are given free access to mineral supplements and are much healthier than previously as a result.

Animal management is now focussed on weight gain at all times. "If pastures are not allowing stock to improve then stock numbers are reduced, if necessary to nil. We have had to change to a flexible cattle trading/breeding/agistment management. Rather than focusing on stock numbers, we focus on having 100 per cent ground cover 100 per cent of the time so that soil is always protected. We no longer run sheep."

Because of this cattle trading operation stock occasionally have to be drenched on arrival.

Workloads have changed, and Martin notes, "Cattle soon become accustomed to frequent movement between paddocks, so that they congregate around the gate; moving them only requires opening the gate and closing it behind them. Labour requirements are therefore minimal and Rosie, the old farm dog, gets lots of rest."

Water Management

Stock are watered via a trough system connected by 3.5km of 50mm pipe from one end of the property to the other, mainly gravity fed from dams high in the catchment.

Eroding head wall cuts were stabilised with natural weirs in line with Natural Sequence Farming techniques. These practices too have come with constant learning. Martin describes, "We commissioned Peter Andrews to advise us on how rehydrating the landscape could spread flood waters back naturally onto the flood plains. We have since built a number of contour channels to rehydrate large areas of the property. Yabbies and fish have been added to most of the weirs and dams to assist in recycling of nutrients and continue building the biodiversity." Wetland

The cattle are moved approximately every three days so that one-third of the pasture is grazed, one-third trampled and one-third left to regrow. "The more palatable, more nutritious, grasses will therefore be only



Erosion gullies have been naturally restored to chains of ponds

plant species were established in all watercourses and weirs.

Changes to the property are notable. Martin points out, "In 1986, there was an ephemeral erosion gully through the middle of most of the property; this stopped flowing most summers. With the re-introduction of natural riparian regeneration processes it has become a permanently flowing 'chain of ponds' waterway. Shallow drains radiating out from the former gully now divert water across the paddocks."

As well as slowing and dispersing flood flows to prevent gully erosion, such natural flows replenish sub-surface soil water that sustains pasture growth. Steady sub-surface flows now recharge what has become a healthy semi-permanent stream. Martin recalled, "It was flowing constantly even when the nearby Shoalhaven River and all surrounding creeks had stopped flowing in December 2009."



Contour channels spread water across the property



Vegetation Management

Pastures are now managed via rotational grazing and no chemicals are used. Ploughing was replaced with surface cultivation and direct sowing where pastures needed to be regenerated. Close monitoring of the species mix determines what and when and how to graze a paddock. "The aim is that there is always a green plant growing to feed the soil biology thus keeping a year round healthy and growing soil and pasture." With rotational grazing, 95% of the property is in rest and recovery stage at any one time.

Black wattles and some eucalypts have regrown naturally as a result of changed grazing management. Extensive tree lane and clump plantings now connect neighbouring forested hills across the property and to provide cattle shelter. Trees are chosen to best suit the conditions. Martin notes, "Manna gum, the predominant original tree species, is attacked by Christmas beetles and struggles to survive in the changed landscape, and perhaps changed soil conditions. Therefore we plant many different tree and shrub species to help regenerate a flourishing landscape."



Dense, healthy pastures of native grasses

Most paddocks now have trees with an understorey where possible. Tree plantings are now designed to encourage stock and birds to move to the top of the hills and to process and recycle nutrients that can then infiltrate the soil and build natural fertility across the property. If he could have his time again, Martin says he would have made tree lanes much wider and planted higher up on the contour to facilitate this.

With the introduction of rotational grazing and other innovations, major weed problem have disappeared on Jillamatong over the last 10 years. Weeds are now seen as part of the soil and landscape repair process where land

has been overgrazed, poisoned or degraded. Stands of thistles are seen as indicators of previous management decisions and can be slashed to prevent seeding but the odd serrated tussock is still chipped out.

Martin notes, "Some of the 'weeds', i.e. thistles and carrot weed, were observed to have very deep tap roots which bring fertility from deeper down in the soil than the shallow rooted rye grasses and clovers. We have now encouraged similar plants like Chicory (*Cichorium intybus*) and Plantain (*Plantago major*) to establish in our pasture to help pump up and recycle nutrients from deeper soils".

Grazing management, weed trampling, combined with pasture rest and high levels of ground cover are the main tools now used for suppressing and managing weeds. Instead of spraying weeds, the spraying of biological fertilisers and building of soil health is now seen as an essential management tool in promoting a healthy pasture. "We also no longer need to spray for red legged earth mite, scarabs, grasshoppers and fungal diseases", Martin points out.

Martin sees biodiversity as the base indicator of the health of the system. Biodiversity assessments are taken along transects noting all the different grasses, forbs and weeds. Martin and Trish have a goal to exceed the present 80 species per transect and increase the proportion of perennial species. Litter levels, ground cover, growth/recovery of plants and insect activity are also monitored. Studies of birds and water quality and monitoring programs of riparian plant and invertebrates species are also underway.

Soil Management

Trials are underway to see if soil organic matter content and fertility can be improved by placing organic matter in strategic heaps in the paddocks to aid their decay and for nutrients to leach across the paddocks. Liquid fertiliser, from worm casts produced on the property continues to be sprayed onto the pastures, with compost teas.

As a result of the holistic management techniques, soils have dramatically changed to be much more friable and porous with increased soil humus levels. Whereas penetrometers previously only penetrated soil a few millimetres at maximum pressures, they now penetrate the soil to a metre at less than 4,000 kPa (kilopascals) pressures. The in-paddock compost heaps and spraying of biological fertilisers appears to have improved the soil and pasture nutrient balances. Available phosphate levels have doubled without the addition of any superphosphate.



Wetland plant species are helping to restore riparian areas

Martin confirms, "We have only applied biological stimulant sprays and changed grazing management focusing on building biodiversity and 100% groundcover 100% of the time".

Salt scalds that were appearing in the 1990s have disappeared due to the increased ground cover and cycling the water and the leaching of salt deeper into the ground.

Available carbon has increased from a range of 0.8% to 2.4% in various paddocks ten years ago, to a high of 2.9% five years ago. Now, best sites have measured close to 7.0% soil organic carbon.

"If you look after the soil the soil will look after you."

As evidenced by the now semi-permanent streams, infiltration of water across the property has increased with enhanced soil structure, improving the water cycle and reducing flash floods.

With greater water infiltration there is less surface runoff. With the soil health improvements grass is now able to grow twelve months of the year. Martin reinforces that, "Prior to change management the old saying was 'you don't have cattle feed till the second week of October'. We can now fatten cattle right through the winter".

Improving the health of the soil has improved all areas of production. "If you look after the soil the soil will look after you."

Lessons Learned

The successes to Martin and Trish on Jillamatong have not come easily. To them it is an integrated process that involves continual monitoring, reassessment and decision making. "As a society we have been trained that when there is a problem we can buy an instant solution in a bag or drum or from an engineer. As the degradation of our landscape testifies, just responding to symptoms via more costly inputs often does not work", Martin states. "This is a lot more satisfying as it involves trying to understand the systems and treating the root cause of the issues rather than the symptoms."

Lessons learned and important components of their success are noted by Martin to include:

- ◆ Be prepared to change.
- ◆ Seek out the best in their field to provide external advice that suits your goals. For Martin this included soil biology, water management, tree planting, stock management, biological fertiliser production, worm farming and leadership.
- ◆ Continue to educate yourself through courses, seminars, conferences, workshops, field days. Martin notes, "In my case this was though conducting tours of the property, delivering talks at conferences, consulting and organising field days for other groups. This helps me learn and improve through the questions people ask and what they can add to my knowledge."
- ◆ Be involved with benchmarking groups.
- ◆ Seek to tick all the boxes for the triple bottom line – work with nature rather than fight against it.
- ◆ Remain focussed on passions and goals rather than getting sidetracked with other enterprises.
- ◆ Understand that there will be resistance from the status quo, but also that it has value in you refining more effective solutions, the evidence to substantiate them and the inevitable changes and benefits that can only come from such local practical innovation.



No Turning Back – Looking at the Bottom Lines

These innovations on Jillamatong have been undertaken by Martin and Trish with the objective of returning profitability, increasing biodiversity and regenerating the health of their soils and landscapes for the long term. It was, and is, important to Martin and Trish to make a business that is environmentally, socially and economically enjoyable. "Our innovations are intended to put ourselves 'out there' as an example of good farming practice that can be taken to the wider community."

The outcomes from such good farming practice are evident. Cattle can now be fattened all year.

During the drought in the past decade there were periods where neighbours were unable to run any stock for up to 11 months due to lack of feed and water and yet cattle on Jillamatong were still being fattened.

Productivity has increased from 1.73 hectares needed to support one cow in 1986 to 1.13 hectares in early 2012, when the environment is still recovering from ten years of low rainfall.

Independent benchmarking programs with farms in the district have shown that production on Jillamatong per 100mm of rain and per labour input was far higher than for any of the other farms studied.

Cost of production was lower than the average in the group and the weight produced per DSE (dry sheep equivalent) was nearly 50% above the average. This, combined with the below average labour input, resulted in a combined profit per hectare per 100mm of rain being 14 times the regional average.

Capital is now spent on improvements such as changed fencing, water and tree planting as opposed to annual spraying of weeds, artificial fertilisers and animal husbandry costs. This has enabled a marked reduction in capital invested on farm machinery.

Water has been slowed down and plant nutrients recycled into the landscape. There is less surface runoff and the pastures now provide year long green perennial grasses. Dew condensing on the tall perennial grasses each night now provides additional water that helps sustain soil moisture and healthy pasture growth.

Biodiversity in the soil, pasture, trees, insect and animal life has increased. Pastures have developed from five species and a few weeds to more than 80 species of useful plants.



Native Microlaena stipoides seeds are being harvested for sale

Soils have changed from compacted to friable and porous significantly enhancing their water infiltration, retention and root proliferation to depth significantly aiding the health, productivity but particularly resilience of these landscapes to climate stresses.

Soil organic matter levels are much higher than under previous management practices. While data is limited, the mass erosion of the top 10-15cm of topsoil from these podsols in the 1982 drought is likely to have removed most of that biosystem's already degraded soil organic matter and with it its available plant nutrient stores and water holding capacity.

Despite its former degraded state this erosion event may have removed up to 90 tonnes of carbon per hectare leaving highly leached mineral subsoils with often less than 0.5% soil organic matter. The subsequent high additions of fertiliser and bio-cides would have enhanced the oxidation of any residual and new organic matter making these soils highly input dependent and vulnerable to stress. By restoring natural soil carbon bio-sequestration processes, initially via the pioneer 'weed' species and then the perennial pastures and rotational management, Martin and Trish have been able to significantly increase their soil carbon levels from the very low 1982 baseline to up to 7.0% soil organic carbon in their topsoil. In doing so, they have also rebuilt the structure, nutrition, hydrology, productivity and resilience of their key natural assets, the health of their soils.

In addition to their main cattle enterprise, Martin and Trish have explored other complementary industries to

maintain cash flow, such as harvesting native grass seed, growing truffles and garlic and breeding yabbies in their many water courses. Significant economic benefits have also been secured via the changes to regenerative farming practices.

These include the reduced cost of weed, fertiliser, vet and machinery inputs and labour, and increased income from being able to sustain weight gain on healthier cattle for longer due to improved pasture growth.

Natural capital values have also increased significantly as a result of the improved soil carbon levels, soil structure and health and consequent increased rainfall retention, water harvesting, lower evaporation losses, desiccation stressors, capture of flood flows and prevention of soil and nutrient erosion. The benefits from such increased productive and resilient landscapes should become most marked as climate extremes intensify.

While health benefits to the soils, pastures, animals and the people that consume them have not been quantified, these too may be considerable as are the health benefits to the farm workers and families. These include health benefits from the significantly reduced debt and stress associated with such ecologically based farming systems when compared with the high input, high risk, high stress conventional alternatives.

Similarly, while biodiversity benefits are also difficult to quantify and extend well beyond the farm they too have been significant, and range from improved soil life and nutrient dynamics to more diverse species and cycles in healthier, restored habitats.

Through this regeneration of his landscape, Martin and Trish have also significantly enhanced their social and personal development and wellbeing. Martin has obtained a Degree in Applied Science, participated in Holistic Management and Biodynamics Courses, Prograze, field days, seminars and conferences. He is a member of organisations such as Landcare, Grasslands Society, Soil Food Web, Carbon Coalition, and a holistic management group. Martin is also a Committee Member on various organisations such as NSW/ACT Serrated Tussock Task Force, Rural Lands



Martin on one of the contour channels used to rehydrate the landscape

Protection Board, Landcare (Treasurer), Upper Shoalhaven Landcare Council, Braidwood Catchment Action Group, and the Natural Sequence Farming Association as the past acting Chair.

Martin has been duly recognised through national media coverage and numerous awards such as Diversification Farmer of the Year finalist, Environmental Landcare award, Carbon Cocky of the Year, Ideas and Innovation Landcare award. He has also been asked to present papers at the National Landcare Conference, Landcare Conference Yass, in Adelaide, and various Braidwood presentations.

"This has given me a positive outlook on farming during a period when a lot of my peers were feeling negative and despondent with the ongoing drought and terms of trade", Martin says. "It is satisfying to be able to encourage and assist other farmers to change their way of thinking through field days, groups and associations I have chaired or been involved in."

Martin expresses sincere gratitude to all those who have assisted him in his learning and making paradigm shifts in his thinking as well as those organisations that provided continued support, encouragement, and willingness to lead and embrace new ideas.





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 already 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 7 - JILLAMATONG NSW

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

The production of the report was supported by funding provided by the Federal Government's *Caring for Our Country* initiative.

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