Working with farmers to increase soil carbon storage in extensive grazing systems

Stories from six Tasmanian graziers experimenting with pasture management techniques

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June 2014
About the project

Tasmania has a long history of story–telling, particularly in rural communities. This booklet continues in that tradition by presenting the stories of six Tasmanian graziers who have experimented with different pasture management techniques on their farms. Each case–study highlights how graziers can make changes to pasture management to best suit their local environment and farm business.

The information was collected in autumn 2014 as part of the Working With Farmers To Increase Soil Carbon Storage In Extensive Grazing Systems Project. The two–year project monitored the effect of management change on soil carbon storage under dryland grazing.

Each interview focused on a particular farm trial, exploring measures of sustainability such as the retention of ground cover, increased soil health and soil carbon levels. Graziers share information on costs and benefits, production wins and losses, and provided insights into how their innovative practices have been used to inform their management decisions.

The stories tell of the importance of the farm trial as an enabler that has led the graziers to make changes to farm management practices. It is hoped that by sharing these stories, they will in turn inspire others to seek information, set up a trial or to use similar techniques to enhance the health and resilience of pasture–based enterprises into the future.

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Project acknowledgements

We thank all the graziers who contributed to this booklet. We also thank the other 14 landholders who were involved in the project, all of whom had stories to tell.

This project was funded by the Australian Government and was supported locally by the University of Tasmania, NRM South, NRM North, Greening Australia, Serve–Ag and the Department of Primary Industries, Parks, Water and Environment.

We thank the project team and all of our project partners for ensuring that the legacy of this project will live on in the form of continued support for trials, maintenance of data in a soils database and a continuation of collaborative research, development and extension activity across the Tasmania.

Photographs were provided by the authors and Simon DeSalis Josie Kelman, Eric Hall, Peter Heading, Gath Coghlann and Nan Bray. Steven Joyce, NRM South, produced the map on page 3. A special thank you to Suzie Gaynor for her graphic design and layout of this publication and her extra attention to detail in presenting the case studies.

Further Information

Further information on this and other soil carbon projects can be found on the following website addresses (search for ‘soil carbon’):

www.tia.tas.edu.au
www.dpipwe.tas.gov.au
CASE STUDY 1:

One person’s waste is this farmer’s treasure — using amendments to drive healthy soils and pasture.

A passion for biological farming and desire to use natural products to build soil fertility has led Pipers River farmer Brian Baxter to trial locally available bi–products as amendments for his pastures and produce his own compost.

In 2009, Brian established a trial site in conjunction with NRM North and Serve–Ag comparing fish waste, poppy mulch and poppy marc and was amazed by the results.

‘This trial has been really looking at fertility and trying to get better fertility without spending money on fertiliser. The poppy mulch was fairly available and seemed to be a fairly good way of just trying something. It was a pretty good little project.’

‘We got an interesting result and we couldn’t understand why the cows always selected one lot [treatment]. So we thought something is happening here… if they can utilise it [pasture] like they did on that patch then you get a lot out of it, there must be something they like. That is what drove us to say well let’s find out what’s going on.’

The initial year–long trial then led to a three–year trial comparing different rates of poppy mulch and poppy marc and the addition of compost. Brian was so pleased with the results from the compost that he has now started producing his own.

‘Now we want to try this compost and do some trials with that. We know now what the poppy mulch and poppy marc will do, it is fairly well documented but now the compost, where does that leave us?’

Brian Baxter
‘Greenside’ Pipers River
470 ha, mixed farming enterprise
Monitoring the results

Brian’s property has been involved in the Tasmanian Institute of Agriculture’s (TIA) soil carbon grazing trial project for the last two years. He explained his reason for being involved as:

‘I guess it is a learning thing, because carbon is in at the moment and we all want our carbon to increase, so anything we can do to increase that is fine.’

Monitoring of the pasture amendment trials showed positive trends for soil carbon and also had a broader impact on Brian’s farm management.

‘Mostly it has inspired me to keep going with all of this.’

‘We have learnt that yes it does improve the pasture and how much we don’t really know because it is a fairly slow process and we are not sure how many years we will get a benefit.’

Brian would like to see further monitoring of his trial site to ‘see if those results just taper and level off, if they drop back or if they keep going.’

Compost Production

A visit to a compost producer was the inspiration that Brian needed to investigate options for producing his own compost. Over the last three years he has been using locally sourced grape skins (from a winery next door), old silage bales (from neighbours) and wood waste from roadside trimming chippers to make compost which is then applied to his pastures.

‘...first year we made a little pile, this year we made a big pile and we are negotiating now to get more grape skins.’

‘The cost is minimal it is just our time to spread it and turn it a few times.’

Evidence of the impacts

Brian has been amazed by the results from his compost:

‘The growth in the paddock was phenomenal.’

He also noticed differences in the grazing preferences of livestock in the treated areas.

Monitoring and testing of the compost has revealed good nutrient levels which Brian attributes the extra pasture growth to.

‘We tested it and then we could see ‘gee this is why it is growing’, the potash and phosphorous in there. If you can obviously see it then it means there is a fair difference. Sometimes you need to measure it to see the difference it might be finite or minute and this was just dramatic, the increase in the paddock.’

‘To measure money wise it is a bit hard as every season is different and stocking rate varies so it is really hard to quantify dollar per hectare improvement... we think it does [make a difference] and that is enough to spur us on to keep going.’

‘You will get a benefit but it does cost. That is why we make all our own [compost]. We may not get enough to do the whole place yet, but you never know how far we will go or how big it will get.’
The use of amendments, composting and rotational grazing management all align with Brian's broader philosophy for natural and biological farming systems which he hopes will guide his farm into the future. This passion is shared by his son Will, who is currently studying at agricultural college prior to returning to Greenside to farm with his father.

‘Long term we would like to go biological… to do away with chemical fertilisers if we could. …we don’t want to mine our country, but if we could replace it with something that is organic and biological it would be good.’

‘Organic would be good, we buy organic where we can. Biological is half way between the two, you don’t have all the restraints on you. If we got to that stage and thought it is not that much far to go further, then we would look at that but that’s probably Will’s call.’

‘It gets back to our philosophy and we think there are lots of benefits, both cost and health wise. Pastures and stock, we are what we eat and I think the same applies to your stock if you have healthy pastures.’

The future
CASE STUDY 2:

Holistic Grazing —
‘I would just say it helps with management.’

In 2009, John and Daniel Tribolet purchased a new property which was suffering following a period of prolonged drought and overgrazing from set-stocking. Familiar with a rotational grazing approach on their main property they saw an opportunity to trial ‘holistic grazing principles’ in an effort to regenerate a degraded site on the newly acquired land. The Tribolets set up the trial in 2010 with the assistance of NRM South and consultant Graham Hand.

‘We picked the site as the worst area on that farm for degradation. [There was] minimal ground cover, you just had sand, sorrel and in some spots, just exposed dirt.’

The trial area is managed using the principles of holistic grazing where large numbers of stock are grazed for short periods of time and then removed to allow pastures to recover with long periods of rest. This approach aims to mimic natural grazing patterns and restore soil and pasture health.

Three years later the trial site has been transformed into a productive grassland with restored ground cover, desirable pasture species and areas where native grasses have re-established. Inspired by their results, the Tribolets have adopted holistic grazing as a mainstream approach for their Swanston property.

‘I think personally that this type of approach, it suits my make up, you can visually see it.’
**Monitoring the results**

The Tribolet’s property has been involved in the Tasmanian Institute of Agriculture’s (TIA) soil carbon grazing project over the last two years.

‘They stepped in a year later [after the trial] to do the sampling on the trial site… we have just been waiting for the results to see what was happening.’

‘The grazing trial is an extreme of what you can do, but it has shown that it works.’

In the three years since the trial was established monitoring has not detected significant differences in soil carbon but this has not deterred John and Daniel who believe that the success from their trial will continue to have benefits for their soils into the future. They acknowledge any change in soil carbon storage is something that takes time to build.

‘It is pretty clear the style of grazing management we are using in the trial area has been hugely successful at restoring ground cover and the microbe activity under the soil. It is pretty evident. The carbon hasn’t been necessarily evident, haven’t seen signs of that but in such a short period of time it is ok.’

‘We know the evidence based on the pastures which are there now compared to what it looked like when we started. It is chalk and cheese the difference and it’s a landscape thing really. We applied the grazing [management] over the whole farm and then you have more pasture cover and it grows back quicker if you leave more residual there.’

**Farm scale change**

The success of the trial has resulted in changes to the way pastures and bush runs are grazed across the Tribolet’s property.

‘What we have tried to do is to reduce the paddock size, to increase the mob size and to replicate what we did on the grazing trial. The grazing trial is very intensive, we went to extremes, to build up the biomass as much as we can and then crash it with a whole heap more sheep than you would on a farm scale. The grazing trial is an extreme of what you can do, but it has shown that it works.’

Smaller paddock sizes and larger mob sizes are allowing the Tribolets to control grazing pressure on their pastures and allow adequate rest to enable adequate regrowth before the site is grazed again. Although rotational grazing practices were previously used (prior to the trial) the residual pasture levels left after grazing have increased by 100–200%.

‘What we will do is reduce the size of paddocks in bush runs and on improved country and increase mob size. That way we will crash-graze the paddocks similar to what we have done in the grazing trial and then [allow] longer rest.’

‘You are giving the grasses more time to recover fully and then get ready to graze again. So increasing the time between grazing and then putting more in for a shorter interval and then getting [stock] off them.’
Evidence of the impacts

The changes in grazing management have had environmental and productivity gains. There have been positive impacts on the pastures and soils which have led to better health of stock grazed on the property. Benefits include:

**Improved condition score:** ‘I reckon we have got healthier sheep. You are moving the sheep off before the pastures get too low and I think it has had an impact on the condition score of the sheep we run. So healthier, stronger sheep is something we have seen out of it.’

**Reduced worm burden:** ‘I reckon we get a better spell for worms, so it is healthier for our sheep.’

**More resilient pastures:** ‘Stronger pastures are there to re-grow and utilise any rain which does come and it doesn’t wash off because of the exposed soil. If you get a rain and have exposed soil it just runs and we are now holding that and letting it infiltrate.’

**More control of grazing pressure:** ‘We can put them into an area where they don’t necessarily graze as hard but they have to because we have the control of it, which makes the area better for the next time they come in as they’ve eaten the rubbish, tidied it up and trodden it in.’

**Better nutrient distribution:** ‘You are leaving their manure and urine where they are grazing it, so you’re not walking to the tops of fields or sides of banks to deposit that.’

**Less soil erosion:** ‘In the past the ground and the earth has been inclined to blow away. We have got less soil erosion and less run off.’

**Reduced dust levels in the wool:** ‘The level of dirt in our wool is less as we don’t have the level of exposed soils that we had.’

Costs

John and Daniel consider the costs of changing to holistic grazing to be minimal and outweighed by the advantages they have gained by using the technique. Costs to consider include:

**Fencing and infrastructure:** ‘Big cost is fencing and infrastructure — cost of getting water to the various paddocks. There is more management time that goes into it, so there is a labour cost. We typically don’t value our time as well as we should. Whereas if you have employees and staff you probably say there is going to be an extra labour cost to this.’

**Labour:** The additional labour component comes as an advantage in that sheep can be monitored more closely and regularly. ‘There are positives out of that anyway as we have healthier sheep because you are looking at them as well more regularly. If you like looking after the sheep… it’s a real plus.’
Practical considerations

Practical considerations which the Tribolets feel are important in converting to a holistic grazing approach include:

Farm layout and stock movement: Ensuring paddock layout is planned for ease of stock movement and to ensure water is available in each of the paddocks.

Accepting that there are times when set-stocking is appropriate: “You can’t achieve it 365 days of the year, when you are lambing and there are management practices to be done. It’s not necessarily something you can plough on through and keep doing. You need to be sensitive to the day to day activities and what happens.”

The increased feed availability from holistic grazing will allow for short periods of set-stocking when needed. “There is more feed in the paddock that you can use if the sheep do have to be set-stocked for lambing or something like that.”

Fencing: The Tribolets have opted to use permanent wire fencing for the paddock subdivisions as they believe it to be better suited than electric fencing due to the numbers of feral deer found on their property. “We have gone for lower fences, five wires and the deer can jump over more easily.”

Grazing interval: Many factors need to be weighed up in determining when to graze; a set grazing interval does not always work. “When we did the grazing trial we used to like saying it is an 80 day or 120 day interval. In reality that doesn’t happen, you have to go with how the grass is maturing, when it is ready to be grazed and the season.”

‘In practice we are probably doing it on the basis of when the grass is ready and where we are in the season. Grazing off but leaving the residual and making sure there is plenty there to re-grow and recover before rainfall and for wind protection. So putting days on interval length is not really valid as long as you are using the techniques we have learned out of the grazing trial on the paddock, and I think we do that.’

The future

As the trial is still relatively young, John and Daniel would like to see more monitoring of their trial site over the longer term to look for changes in soil carbon and resultant microbial activity.

“I’d like to see more on-going data and results. We have only seen a two-year window and I think everyone acknowledges it isn’t long enough. Even if it wasn’t monitored every year, maybe every second year, maybe that’s enough for soil carbon.”

“Soil microbe activity, I think it is a big indication of the soil system starting to get back to a more normal type system, where as it hasn’t been that way through the drought and previous management.”

John and Daniel believe the changes they have made will be sustained in the long term and feel holistic grazing is a good fit with their approach to farming.

“It is an on-going process of still getting our paddock size and mob size right and not forgetting you are waiting for those grasses, so taking the stock off early enough to achieve [re-growth].”
Trialling methods to protect soils on north-facing slopes.

Faced with soil loss from a north-facing slope John and Don Jones embarked on a project to put in place measures that would significantly reduce the erosion risk on their Kempton property. Through contour ripping, changes to grazing management practices and sowing of new pasture species they achieved their goal.

Contour ripping is part of the Keyline approach to improve water capture on sloping ground. Keyline cultivation can lead to improved water infiltration when combined with improved grazing and ground cover management.

In 2001, with the assistance of the Australian Government’s North-Facing Slopes Project and staff from the Tasmanian Institute of Agriculture (TIA), the hillside was divided into three sections and a pasture trial site was established in one of these. The pasture trial involved the sowing of new pasture species to evaluate them for grazing and drought tolerance. The associated fencing enabled John and Don to have greater control of grazing in order to reduce the impact of selective grazing from stock. These measures have led to increased ground cover across the area and have resulted in productivity and environmental gains.

‘[Prior to the trial] we had open range grazing and we found that we were getting bare areas and non-grazed areas because of differences in [pasture] sweetness… grazing was possibly concentrated on one third of the area and neglected in others. The other problem was that in heavy downpours we were losing the water that was coming down flowing through and we had some soil erosion.’

‘Our target was to retain more moisture on the hill through the terrace farming or deep ripping. Through TIA they came up with the North-Facing Slopes [project] for finding sustainable [pasture] grasses.’

Thirteen years later the brothers are very pleased with what they have achieved from their management changes.

‘We found it to be very successful. We achieved our aim of retaining more moisture, of growing sustainable grasses and have also basically eradicated all the soil erosion.’

‘That hill wasn’t a productive hill before. The production on the hill has increased.’
Monitoring the results

Over the last two years John and Don’s pasture trial site has been monitored as part of TIA’s soil carbon grazing project to look at the effect of the sown pasture species on soil carbon. John explained:

‘We have been involved to see if our future practices would retain carbon and hopefully increase our carbon level; that was our intent.’

Monitoring of soil carbon levels on the trial area did not show a difference between the sown pasture trial area and the semi-native conventional pasture. However, anecdotal evidence comparing soil carbon levels from soil tests taken at the start of the trial suggests that overall soil carbon levels on the hillside have increased as a result of broader management changes.

Evidence of the impacts

The success of the trial has led to the use of these technique on other parts of the property.

‘…six or seven years ago we were developing a type of erosion on the other face of the hill and that was starting to erode. So we deep ripped the top of the hill and we deep ripped down the side and stopped the erosion dead, it just contained it. It works, there are no two ways about it; it works.’

‘We have also split the run, where it was one general run is now divided into three sections. We rotate stock through it.’

Costs

The Joneses explained that there are different costs when using these techniques on north-facing slopes. They include:

- **Deep ripping**: ‘We have our own bulldozer with a ripper on it… I suppose [hiring] a dozer is $120 per hour.’
- **Seed costs and expertise**: ‘…ripping is not the real cost, it’s the seeds and the availability of the appropriate seeds at an available price, to get into those areas. You need the expertise of people like Eric Hall [TIA pasture researcher] who can give you the right information and particularly the appropriate seeds for the area.’

‘There are more areas that could be improved holistically but it is subject to finance and time.’
Practical considerations

Practical considerations for contour ripping include:

**Soil condition:** Careful assessment of soil condition is required prior to ripping to ensure the cultivation does not result in tunnel erosion and or the formation of gullies.

**Steepness of the slope:** ‘You need to have a look at is the actual steepness of the slope. Whether it is practical to move along; you can have it to the degree that the bulldozer will want to slide or even dig in then it can become unsafe.’

**Having a skilled operator** ‘We had a very experienced operator and he was phenomenal with what he did. The restrictions are the angle or the slope and to achieve the target you have to get at least two thirds up that run–off area.’

**Spacing of the ripping:** ‘The other thing is not to over space between the ripping. I think we used to rip three or four runs a then leave a distance of 10 or 15 metres and then rip again. That way the rip stops the water and it starts to bed in, the distance between the rip was far enough to start a sheet running again, so you have got control.’

The future

Encouraged by the results from the sown pasture trial, John and Don look forward to new pasture seeds being made commercially available so they can utilise them more broadly across their property.

‘I'd like to see some more of those exotic seeds in some of our other ripping areas. Because it is steep it is not practical to tow something behind to sow the ripping area. The idea would be to hand sow after it has been through.’

‘There needs to be a lot more information provided than we still have on the seeds that are coming up trumps in the trials and on their commercial availability.’

They believe the use of deep ripping for increasing water infiltration combined with grazing management is an effective technique for managing north-facing slopes. They would like to see these techniques used more commonly throughout Tasmania.

‘I think deep ripping or contouring should be further investigated. It is an old practice and I think it should be brought in to an essential means to help other areas.’

‘You can go from the hill that everyone is criticising to that [what it is now]. It could become a model for a lot of people to use.’

Trial Site: Before and After
CASE STUDY 4:

It’s a mind-set thing — using planned grazing to benefit soils and pastures.

Gerald Ellis has committed to improving the condition of his land for the long term and for the benefit of future generations. He has used cell grazing principles on areas of his Meadowbank property for more than twenty years and is still inspired to learn more:

‘We have always been involved in Allan Savory’s cell grazing principles, some areas successfully other areas not so successfully.’

Gerald recently set up a trial in conjunction with NRM South to use ‘holistic’ grazing principles to improve pasture composition and soil health in poorly performing pastures that are dominated by bracken fern.

‘We had a lot of light sandy country with bracken fern. We have always believed in, and have seen some results from, our rotational cell grazing principles, the impact on these areas. We felt it would be interesting to see in some really intensive areas what would happen over a period of years if we graze that on a cell grazing basis.’

Gerald grazes stock for five to six days, then pastures are rested for two to three months. The trial site uses holistic grazing principles by intensively grazing a 1 ha fenced area with large mobs of stock for a short period (days) and then giving the paddock a rest for a long period (six–twelve months) before grazing it again. The holistic approach is designed to mimic natural herd impacts on pasture. Based on his experiences over the last twenty years, Gerald is hoping that this more intense grazing management (in the trial area) will result in positive changes to the soil fertility, carbon content and pasture species composition on the site.

‘As the soil fertility builds up because of high carbon content and from intense grazing over a short period with long rest periods, I think the bracken fern will slowly disappear… I’d like to see some more high quality pasture species and for the native species to move in and replace the bracken.’
Monitoring the results
Gerald has been involved in the Tasmanian Institute of Agriculture’s (TIA) soil carbon grazing project. A cross-fence comparison has been set up to compare soil carbon under conventional grazing management with the intensive holistic grazing approach applied in the trial. Gerald realises that changes in soil carbon storage take time but he is optimistic that the changed management practices will have positive results in the future.

“These things are going to take many years, so to get a result within 12 months or a couple of years is not what we would expect. I certainly don’t expect to see significant changes in my lifetime but perhaps in another fifteen to twenty years time maybe some changes will be visible.”

Evidence of the impacts
Over the years Gerald has experimented with different grazing management approaches on problem areas on his farm. The positive results have provided the inspiration for his most recent trial.

“We have certainly noticed a change in a couple of paddocks that have got bracken fern that we have been rotational grazing now for about twenty years. We have seen a decrease in bracken fern and an increase in better pastures.”

“The reason I know there is a difference is because when we went to muster that paddock there used to be areas I wouldn’t even think of walking through without considerable difficulty, in fact I couldn’t, in areas the bracken fern was too high and now you can comfortably walk through the whole paddock.”

Costs
Gerald believes the switch to holistic grazing is a low cost change and considerations include:

Fencing: ‘The only cost is fencing, which can fit into your normal fencing program anyway.’

Labour: ‘There is a little bit more labour, but not a significant amount.’

‘The loss of carbon in soils has long term impacts [which are] totally underestimated by graziers.’
Practical considerations

Gerald lists the following practical considerations for implementing a holistic grazing approach:

Moving to a cell grazing system requires a mind-set shift: ‘There is a mind-set change. The problem with sheep is that the animals respond very quickly to changes, you can see their condition fall, they will start losing condition much earlier and [therefore] you tend to ignore the condition of the grass and the soil but always look after the stock, at the disadvantage of the soil and pastures.’

Water access and flow rates: ‘Water is a bit of an issue when you are doing this sort of thing. In terms of infrastructure it may require a bit of thought as to how you best do that aspect of it. Having flow rates that are high enough but also having water access points.’ Gerald uses a portable water trough in his trial area.

Paddock subdivision: ‘In a more intensive basis you need to have smaller paddocks and I would suspect that somewhere between five and ten hectares would be the maximum size to be effective to produce a result in the short term.’

Mob size: ‘The larger the better and it depends on paddock size. Most of the mobs are between 500–1000 sheep.’

The future

Looking forward, Gerald sees the potential to use organic pasture amendments to help boost the condition and fertility of his soils.

‘We don’t fertilise and we haven’t fertilised our pasture for many years, but we know that fertiliser would certainly be a benefit and we would get a better performance from our pastures.’

‘What I’d really like to be able to do, is to fertilise our pastures with compost and use organic fertilisers rather than inorganic fertilisers… There are a lot of factories producing organic material suitable for composting currently being put in landfill; which is a shame that they can’t be more widely used to add carbon to soil by spreading, it is just a question of economics really.’

‘It would be really interesting if there was some sort of database in the community of carbon-producing waste: there’s fish farms there’s wood mills, wineries, fruit producers, there are dozens of different sources… at the moment a lot of it is just going into land fill.’

‘…it is just an attitude and paradigm shift… I don’t think you need to sacrifice stock condition but the temptation is that it is much easier to open all the paddocks and leave them there for a couple of months and then come back… and you know they are all right as they have all that grazing area.’

‘This is not a short-term thing, [but something that my] great-grand children will hopefully benefit from.’
Oatlands grazier Nan Bray has undergone a transformation in the way she thinks about and manages the pastures on her property. Though her involvement in the Tasmanian Institute of Agriculture’s (TIA) soil carbon grazing project and the lessons she has learnt through practising traditional shepherding principles, Nan has put the pieces together and is adapting her pasture management to bring more perennial species into her pastures.

The process of learning began in attempt to bring native plant communities back into her Oatlands grazing property. In 2008, Nan planted more than 6,000 native tree seedlings that had been germinated from locally collected seed in a 10 hectare area. The site was fenced off to exclude stock until the trees were large enough for the underlying pasture to be grazed. This site was monitored as an ‘exclusion’ site as part of TIA’s soil carbon grazing project. The project measured the effect of stock exclusion (four years) on soil carbon levels and composition of pasture species when compared to a grazed paddock across the fence.

‘The site was set up as a re-vegetation experiment... It was the first project I did on the property in trying to bring some native diversity back into the sandy parts of the property. The fence was basically to exclude stock until the trees had a chance to get going.’

The re-vegetation proved to be very challenging with only one third of the trees planted surviving due to the light soils and drought conditions that prevailed not long after planting.

‘I learned to treasure the things that are there naturally as it is incredibly hard work trying to re-establish anything native... I put in an irrigation drip line and then I didn’t have any water because of the drought so I ended up having to water them with my fire-fighting unit.’
Monitoring the results
The results from soil carbon analyses were not significantly different in the revegetated area and the grazed pasture. However there were learnings from monitoring this trial. Nan explained that:

‘What I took away from all of the information is that it is coming down to soil type and rainfall, which are two things that you don't have a lot of control over. So basically the next step is what kinds of things can we change in the management, even if we have to wait a number of years to make a statistically significant difference?’

Exclusion versus pasture performance
The exclusion from grazing had a big impact on the pasture, resulting in rank pasture in the ungrazed area. This result highlighted the importance of grazing management for optimising pasture performance, leading Nan to re-evaluate the way she manages cocksfoot-dominated pastures on the rest of her property.

‘Having it rest for as long as I did, I've ended up with some very rank pasture grasses.’

‘…without that exclusion [on the re-vegetation trial site], I wouldn't have got the trees to grow. I will say that I now believe that long-term exclusion is not the right thing to do. That has altered the way that I am thinking about how I utilise the rest of the property.’

Grazing Management
Nan has a different approach to grazing management from many conventional farmers. She practises traditional herding principles with her merino flock and in doing so uses rotational grazing practices based on the teachings of Allan Savory's holistic grazing principles. Six years ago Nan started using a concept known as ‘nutritional wisdom’ with her flock of sheep. This concept is based on principles where lambs remain with their mothers in family groups rather than age classes, to learn which plant species to graze to provide their nutritional and health needs.

‘With my nutritional wisdom stuff the first two years were fabulous. I got rest in the system, I got a lot of diversity, huge production benefits from it, and then after about five years I had rank cocksfoot at the bottom [of the paddock] and short annuals at the top.’

Nan plans to use holistic grazing principles using a short intense graze with a large mob of sheep followed by rest to improve pasture composition on the trial and other sites dominated by cocksfoot.

‘I have been working on rank cocksfoot in other parts of the property, using the sheep [through grazing management]. I am definitely starting to see things lighten and open up. I don't know how long it will take, but I am pretty confident that I can get it into a better growing state than it is at the moment.’
‘What I see really is periodically an incredible outbreak of annual grasses… it has really made me re–think how to do the spring grazing.’

Pasture composition: annuals versus perennials

Pasture composition measurements from TIA’s soil carbon project monitoring revealed a dominance of annual species within the pastures and resulted in a big learning for Nan.

‘I thought that my perennial levels were higher than they are or conversely that my annual levels were lower. What I really hadn’t taken into account was that [my] clovers are annuals. That has really added to the way I am trying to work through to discourage the annuals and encourage the perennials [in my pastures]. Pretty much all my sandy country is like that.’

‘What I see really is periodically an incredible outbreak of annual grasses. …it has really made me re–think how to do the spring grazing.’

‘I lamb fairly late, I don’t lamb until October and I shear in August and September… Normally, I would put them back up onto the dolerite country which doesn’t have any annual grass problem, while the annuals are going mad down here [on the flatter country]. This year I am going to change that around and actually try to hammer the annuals really hard in spring and also change where I am lambing so that the sheep have access to some other places.’

Evidence of the impacts

In terms of the broader farm management practices the exclusion trial and subsequent pasture composition monitoring has changed Nan’s thinking and decision making processes.

‘Probably about two weeks after the assessments were done in October last year, the spear grass [brome] really hit… this kind of opened up a part of my brain in a way that made it a little easier to start thinking about the annual grasses and that in turn has made it easier to think about what [Allan] Savory is talking about in terms of holistic management. It was like a little pebble that started an avalanche down a hill.’

‘…as I understand from Savory, basically what he is saying is that if you get your stocking density high enough by using lots more animals or by cutting paddocks up into very small bits then you can start to get some of the benefits of herd effect.’

‘I think that with running all my sheep together in one big mob… I can get a pretty reasonable animal impact in there in four or five days and then move on.’

‘When you are in the process of change a lot of times several different things hit all at once and add up in some way and allow you to make connections that you hadn’t before, so in a way this was kind of an early warning. You really want to think about this annual stuff.’

‘I’ve already got 60 km of fencing on 850 acres so that to me seems fairly excessive, so I’m not going to cut down any smaller.’

‘So the whole thing just went click for me, because I like to do herding anyway. I have always done a bit of shepherding and now I am doing it pretty much every day. By moving the animals through the landscape, at least initially I know I can get a herd effect and I know I can get better utilisation on the pastures.’
‘I recognised that I had to do something different, but I didn’t know what it was that I needed to do.’

Costs
Nan considers her approach to be low cost, with fencing and water being two areas that may incur costs for those moving to a rotational grazing system.

**Fencing:** ‘If I wasn’t willing to do the herding then there would be some fairly significant costs in fencing… I’m actually starting to take down fences [because] with the herding I don’t need to have a lot of fences.’

**Water:** ‘I have done my watering system so that I have reticulated water throughout the whole property.’

‘In terms of costs in the production system generally, for me the costs have dropped off in the last few years between the nutritional wisdom and the rotational grazing.’

Practical considerations
Finding a balance between animal and pasture health:

‘The biggest issue is being good at managing the animal health as well as the landscape health. You are probably on a bit of a sharp point all the time, so there is a tendency to slide one way or the other.’

**Time commitment:** ‘If you are going to herd then you need to recognise that it is a real time commitment. It is really fun and really peaceful and I love doing it but it wouldn’t be for everybody…’

**Low stress:** ‘If you are not going to build fences then you have to be committed to some form of shepherding and for that to work it needs to be fairly low stress as the animals are not going to eat if they are stressed.’

The future
Nan believes the grazing management changes she has made will be sustained into the future. She is already seeing benefits in extra feed grown and is considering increasing her stocking rate to deal with the increased feed.

‘I can already see in a few months that I will have a lot more feed through the process that I am going through now. I am honestly gob-smacked at how much feed I have, through the combination of starting to get the soil and leaf litter working and also utilising the pastures, really utilising them.’

Nan is committed to holistic grazing principles and using shepherding to achieve this on her property. She admits that this approach is not for everyone but one that she enjoys and suits her philosophy for caring for her animals and her land.

‘Now I at least have an idea of how to go down that track and a much better appreciation for the fact that it isn’t and will never be [a] formulaic [approach to] agriculture. It will be on the ground all the time, paying attention to what is happening.’

In regard to soil carbon Nan feels that there is still much more to learn. In the meantime she feels that her grazing management approaches are heading in the right direction.

‘I recognise that this is where I am in terms of the farm and just try to manage as well as I can to maintain the level of leaf litter, ground cover and microbial activity in the soil, knowing I am doing as good a job as I can do within the constraints of my soil type.’
Tony Scherer had a change in mindset when it came to regenerating a degraded north-facing slope on his Frogmore Creek property. Contrary to his ‘horticultural’ instincts to apply lime and compost, Tony took the advice given to him from a North-Facing Slopes project officer to fence off the degraded hill slope, exclude stock and allow it to naturally recover. A few years later the positive result gained from the exclusion has been a complete surprise to Tony.

‘I’m from a horticulture background not a grazing background. In horticulture you look to fix things yourself. So you get a soil analysis and if it calls to put on compost, lime or gypsum then you do it, well with bigger land areas like this that is very difficult. So I was not convinced, because of my background that you can just leave it go and it will tend to fix itself, but it did, and that really surprised me.’

The site was excluded from grazing for two to three years and since then has been grazed on a very limited basis using an approach known as holistic grazing.

‘They would put in 200–300 sheep in there for a couple of weeks and then we would take them out.’

‘I had taken a holistic management class in Western Australia years ago, in the early 90s, and I knew something about how it worked but had never practised it. So when NRM South suggested that we have a look at it, I got interested and started going to some workshops and that is what we are doing there now.’

By fencing off the slope Tony is now able to control when and for how long the sheep graze. This reduces the potential for over-grazing on the site which was preferentially grazed by stock in the past due to its north-facing aspect.

‘The interesting thing was that before the north-facing slope was fenced off, they [the sheep] would graze down on the flats and then in the evenings they would come up and camp on the hill side. You would watch them up there and there would be no grass, just soil and they would still have their heads down munching on something. It almost looked like they were licking the soil.’
Monitoring the results

Tony has been involved in the Tasmanian Institute of Agriculture’s (TIA) soil carbon grazing trial project for the last two years. He explained his interest in being involved as:

‘I am fairly familiar with soils; soils are something that I know about, so I was interested to see what the development [in soil carbon] would be like.’

The project used a cross-fence comparison to measure any changes in soil carbon levels between the exclusion/holistic grazing site and a set-stocked paddock next door. Whilst the short timeframe of the trial has meant that differences in soil carbon measurements are not conclusive, there are other key points that Tony has learnt from the experience.

‘The main thing that I have learnt is that you can take a piece of degraded land and pretty much not do anything with it and watch it recover.’

‘What I realise now is that a lot of the grass species in there now are not really the best as far as palatability and nutritional value. Now what I want to do is see how we develop the right species in there.’

Evidence of impacts

The exclusion and subsequent controlled grazing has seen a shift from bare ground to a slope that now contains grasses, herbs and newly emerging native seedlings. This is important for rebuilding lost soil carbon, retaining soil, reducing erosion and providing habitat that will drive a sustainable pasture system.

‘The erosion was unbelievable, the shift from capeweed to grass and then you say to yourself, where did all of that come from? Well if you provide habitat in any system from something good, then good will probably happen. If you provide habitat for something bad, it will happen as well.’

‘That’s my evidence, I go up there now and it’s all grass and a few species of herbs and things. There are still some things that we will have to do like take out the box thorn, but 90% of that area has fixed itself.’

‘The other thing that is happening is that native trees are starting to re-seed themselves. We’ve been careful to fence some of those areas off, so that the sheep don’t get them.’

Tony believes that the changes are significant and will be maintained as long as he is managing the property.
Costs
The biggest surprise for Tony was that he has been able to regenerate the site at virtually no cost.

‘That’s the amazing part. If I’d used my horticultural background I would have spent a lot of money on there. I would have limed it, I would have tried to re-seed it somehow… Rather than just allow it to recover.’

Practical considerations
In a practical sense Tony believes that it is important to understand the limitations of your property and to match your enterprise type and management accordingly in order to be sustainable in the long term.

‘We are in a very low rainfall area, so we are not like the North West Coast where they have lush pastures all year round. So what happens is, if I bring my ewes in to lamb in say July there should be plenty of grass there, in a normal year. However between November to January there is a point where it stops raining and it all turns to dry grass and you can’t fatten lambs.’

‘So I don’t know that I have lamb-fattening country. I have great country to raise young lambs but I need to feed them to fatten them. I found this out over the last two years because this is what has happened. So I don’t get them to a weight where I want to sell them from pasture. So from a practical stand point I may need to change what I am doing.’

‘That is a practical consideration for me. For someone like my neighbour, he has cheap water, reuse water, and grows rape or barley or something with a centre pivot. Maybe what I need to do is make an arrangement with him where I run more ewes and he fattens the lambs.’

The future
Tony now has plans to apply his new knowledge of holistic grazing principles to develop other areas of his property and continue the leaning process he has started.

‘We’re trying to develop other areas on the farm for grazing and those are the areas that are least accessible for instance to either grow vines or vegetables on. So I want to practice the same techniques.’

‘What we are trying on a very small scale is to stock it at the right levels, always have cover, and build not only sol carbon, but build the right species in a natural setting.’

‘From a practical stand point you have to say to yourself — I’m a grazier. If I was getting my income from grazing that slope I would be broke. That’s because it went too far the other way and I am now having to allow it to recover.’
“It was like a little pebble that started an avalanche down a hill.”
Nan Bray

“It’s a significant change because it is not being over grazed. It’s managed rather than mis–managed. That’s the difference.”
Tony Scherer

“I’m passionate about sustainable agriculture. I am fourth generation and my son wants to come home and it’s important.”
Brian Baxter

“This is not a short term thing [but something that my] great–grand children will hopefully benefit from.”
Gerald Ellis

“It works, there are no two ways about it; it works.”
John & Don Jones

“Once you get into this sort of thing, it gains momentum.”
John Tribolet

“It’s a significant change because it is not being over grazed. It’s managed rather than mis–managed. That’s the difference.”
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