



Adapting Regenerative Grazing for Low Rainfall Sheep Production

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Executive summary

Regenerative grazing is currently not commonplace within Australia's lower rainfall and sheep dominated areas.

Observations from The United States (US) and South Africa have proven that regenerative grazing can be applied to lower rainfall areas with success. That success has been measured as a sustainable increase in overall carrying capacity.

To understand how to implement a regenerative grazing system it is recommended to first seek some formal training. Understanding key concepts will allow for best adaptation to an individual environment and circumstance. It is much easier to learn how to do something if you first understand why you are doing it.

Both sheep and cattle properties were visited in low rainfall areas that each had their own story of learning and success. Indeed, the level of success was staggering with increases to carrying capacity of 1.5 to almost three times their original.

Sheep dominated regenerative grazing systems were shown to provide significant increases to overall carrying capacity. Cattle systems however, or systems incorporating both sheep and cattle, proved to show the greatest potential for increased carrying capacity. Improvement was created faster and to a greater degree when grazing cattle as opposed to sheep alone.

How to setup such a grazing system must consider additional labour and infrastructure costs. Well-designed paddock systems as well as cheaper forms of fencing, namely electric fencing, provide real solutions to make the initial period more accessible.

A key to getting the most out of pastures without negative impacts is to appropriately match stocking rate to carrying capacity. The three inventories, grass, money and livestock must be considered and managed together.

Keywords: Regenerative grazing, sheep, cattle, low rainfall.

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Foreword

Since 2014 I have been a part of our family livestock enterprise with my parents and brother, based at Wanganella New South Wales (NSW). In early 2025 we went through an amicable succession process resulting in my wife Sarah and I now running our own enterprise. Our property is often described as being station or pastoral country characterised by open plains of native grass and bush. Our business has three enterprises with the largest component being commercial merino breeding as well as a merino stud and angus cow herd. Prior to taking a place within the family business I studied a bachelor of Agricultural Science/Bachelor of Business at Latrobe University Melbourne. I then went on to work at Meat and Livestock Australia for three years within their sheep genetics team, specialising in the use of estimated breeding values for genetic gain in seedstock enterprises.

I arrived home with a passion for animal breeding and the stud stock sector. Well prior to my involvement, my father had engaged the services of Dr Jim Watts to transition our traditional merino flock to the Soft Rolling Skin (SRS) merino. A style of merino developed by Jim and characterised by its focus on producing an elite fibre on a wrinkle free animal that does not need to be mulesed. This approach challenged the entire merino industry and came with a torrent of criticism. As a research scientist, his new approach to merino breeding was backed by real, peer reviewed, science. Fortunately for us, Jim had the courage and drive to continually challenge the accepted norms. My father and a relatively small group of other breeders also had that some courage and foresight to take on and adopt Jim's advice. My brother Marcus and I were fortunate to work with and learn from Jim prior to his passing in 2019. SRS sheep are now an absolute cornerstone of our business and has positioned us at what I believe is the leading edge of merino production.

It is with the same attitude that I have chosen to step into and explore regenerative agriculture through the opportunity offered by Nuffield Australia and my sponsor Australian Wool Innovation (AWI). There are some fantastic claims about the results possible from regenerative grazing however there are also no shortage of people who warn that it may not work in at least certain environments or situations. Prior to this study I was only vaguely familiar with regenerative grazing systems and in no position to work out which was true. On top of this my limited exposure had only ever given examples of regenerative grazing within higher rainfall environments and within cattle enterprises.

Our current grazing enterprise receives approx. 350mm annual rainfall with grazing on native pastures only. Our environment and system are based on low input grazing. There is no renovated pasture, no fertiliser used and very little weed control. For the most part, rainfall alone dictates our capability to grow feed. Our greatest opportunity to impact land performance is through how we manage our grazing animals. For this reason, I am excited by the possibilities offered within regenerative grazing systems.

To research this topic, I travelled through different parts of The US and South Africa. These countries were chosen as hotspots for those practicing regenerative grazing and offered grazing systems under a similar rainfall as our own.

I have thoroughly enjoyed the opportunity to travel the world and research this topic and feel truly enthused about my position and opportunities within our agricultural industry. Writing this report has given me the chance to reflect on all I have learnt and I now set myself the challenge of putting it into action.

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Travel

Table 1. Travel itinerary

Travel Date	Location	Visits
13 th - 20 th March 2020	Australia: Tangalooma Island	Contemporary Scholars Conference
29 th - 31 st March 2021	Australia: Albury	Farming Matters Conference
16 th - 22 nd June 2021	Australia: Wagga Wagga	Resource Consulting Services (RCS) Grazing for Profit course
24 th March - 2nd April 2023	New Zealand: Christchurch to Queenstown	Nuffield International Triennial Conference
3 rd - 11 th April 2023	Brazil	Global Focus Program
12 th - 17 th April 2023	United States: South Texas	Global Focus Program
17 th - 20 th April 2023	England: London	Global Focus Program
20 th - 22 nd April 2023	Belgium: Brussels	Global Focus Program
23 rd April - 10 th May 2023	United States: Texas Colorado Wyoming	Tim Steffens Mike Turner Justin Radar Storm Casper Kelly Ketner Laura Burandt Grady Grissom Sage Askin
1 st - 24 th February 2025	South Africa: Port Elizabeth Graaf Reinet Eastern Cape Northern Cape Free State	Regenerative Land Management Course Roland Kroon James Brodie Sholto Kroon Kosie and Charel du Plessis Andrew Jordaan Luke Bell

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		Rowan Stretton Ecological Outcome Verification (EOV) training Konsortium Merino
25 th - 27 th March 2025	Australia: Albury	KLR Marketing course

Acknowledgments

I would like to thank my sponsor Australian Wool Innovation (AWI) for making my Nuffield travel and experiences possible. I hope my report and experiences can be shared for the betterment of our wool industry.

Thank you also to all those at Nuffield Australia for the support and indeed continuation of such a fantastic scholarship.

A huge thanks to all the farmers, researchers and industry professionals who were so willing to share their stories and indeed open their farm gates and homes to me.

Thanks must go to Dr Tim Steffens of West Texas A&M University US and Erwin Woolward of Segard Masurel Wool Brokers in South Africa. Both Tim and Erwin were instrumental in hosting me but also arranging many visits within their respective countries. Both were unbelievably generous with their time and willingness to assist.

Thanks finally to my wife Sarah, you gave me the courage and support to chase this dream.



Figure 1. Author with Erwin Woolward of Segard Masurel, South Africa (Source: Author, 2025)

Abbreviations

AI	Artificial Intelligence
AWI	Australian Wool Innovation
DSE	Dry Sheep Equivalent
EOV	Ecological Outcome Verification
GPS	Global Positioning System
ha	Hectares
mm	Millimetres
NSW	New South Wales
RCS	Resource Consulting Services
SRS	Soft Rolling Skin (Merino)
UK	United Kingdom
US	United States

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Objectives

The core objective is to adapt regenerative grazing to Australia's low rainfall and sheep dominated areas. To do this the following steps were taken:

- Create an understanding of the methodology behind the practice
- Consider the low rainfall, rangeland type environment and the considerations needed for that grazing system
- Provide real examples of regenerative grazing success or failure for production systems within a low rainfall, rangeland type environment
- Explore how sheep and cattle contribute differently to a grazing system
- Create an understanding of the real practice change and farm improvements required to undertake regenerative grazing.

Introduction

Regenerative grazing systems offer the potential to improve the total health of our ecosystem in the form of improved soil health, carbon sequestration and plant biodiversity. These improvements can be valued in several ways. The term regenerative agriculture is open to many different interpretations and applications.

This drive to define and label regenerative agriculture, reduces broad principles and practices to a set of boxes, and boxes concern me as they put a lid on innovation. Personally, I'm interested in how we keep expanding and transforming what's possible for landscapes and people in this evolving world? (Masters, 2019).

For the purposes of this research and report the focus has been on the positive impact that can be created, with grazing animals as the primary tool, and measured by improvement in land carrying capacity.

This report aims to explore the potential and its application of regenerative grazing within environments similar to what is the authors home environment. This is a low rainfall rangeland type environment typical of Western Riverina NSW.

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Core Principles of Regenerative Grazing

Regenerative agriculture doesn't manage plants or livestock, it manages the four ecosystem processes through decisions about timing, intensity, and diversity. Time, area, and density are key tools used to mimic natural grazing patterns and improve land health. These three factors work together to control animal impact on plants, soil, and ecological processes; helping to regenerate ecosystems rather than degrade them. An increase in soil health, biodiversity and overall productivity are key targeted outcomes.

A key to understanding how to successfully implement a regenerative grazing system is to first understand the key concepts involved. Formal, classroom style, learning was gained via the "Grazing for Profit" course in Australia, Delivered by Matt Barton and Michael Gooden of Resource Consulting Services (Barton & Gooden 2021), as well as the "Regenerative Land Management" course in South Africa, delivered by Roland Kroon, director of Healing Hooves (Pty) Ltd, and Savory Institute Master Field Professional (Kroon, R 2025). The information in this section has been taken and interpreted by the author from the course material and notes taken during presentations.

Brittleness Scale

The brittleness scale, developed by Allan Savory (Savory, 2021), describes how ecosystems respond to disturbance, especially grazing. It's essential in regenerative agriculture because it influences how we most appropriately utilise the tools such as livestock, rest periods, fire, and mechanical disturbance to promote healthy soil, plants, and water cycles. The brittleness scale is a continuum from one to ten that classifies environments based on:

- Rainfall frequency and distribution
- Humidity
- Rate of biological decay
- Resilience to disturbance

Brittleness characteristics examples:

- One (non-brittle). Humid year-round, fast decay, organic matter breaks down biologically. Typical environments: rainforests, United Kingdom (UK), Pacific Northwest
- Ten (very brittle). Seasonal or erratic rain, dry most of the year, slow decay, biological processes shut down for long periods. Typical environments: deserts, Savannas, Australian rangelands.

How this applies to regenerative grazing in non-brittle environments:

- Decay of plant matter is rapid with microbial breakdown.
- Rest from grazing - works well; plants recover without much intervention.
- Animal impact - less critical; overgrazing is main concern.

How this applies to regenerative grazing in brittle environments:

- Animal impact and grazing is essential
- Hoof action helps break crust and cycle nutrients
- Long rest periods are critical to allow recovery
- Continuous rest (no grazing at all) can degrade the landscape over time.

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The western Riverina is a low rainfall area that predominately receives precipitation during the winter months with systems geared up for winter growth and summers that are hot and dry. With a relatively low rainfall and a general lack of humidity the western Riverina would likely be placed around seven or eight on the brittleness scale.

Within a non-brittle environment plant breakdown occurs relatively fast via a microbial process leading to high nutrient availability for new plant growth. With rest, a non-brittle environment can recover relatively easier.

In a more brittle environment plants breakdown in a much slower chemical process. Long rest periods as the only tool does not work in more brittle environments because the chemical breakdown of material is so slow and can lead to further damage. From Allan Savory's work we now know that the answer lies with intervention of ruminant animals. The lack of biological activity in the soil can be replaced by the high biological activity that occurs within the gut. Ruminant animals have the ability to speed up the breakdown of plant material thus allowing for more nutrient availability to stimulate further plant growth.

The ruminant animals play a greater role than just digesting and breaking down plant material. Their hard hooves are also essential for the mechanical breakdown of plants through trampling thus returning organic matter into the soil. The trampling process also helps to break through a hard crust and prepare the seed bed. A key learning from Roland Kroon of South Africa was that of the importance of preparing the seed bed. A common misconception is that plant growth is limited by seed availability. In areas of native pasture, the seed is almost always there, the focus must remain on preparing a seed bed and making moisture and nutrients available.

Understanding the brittleness scale has been a breakthrough learning in understanding how regenerative grazing can be used as a tool within the targeted western Riverina environment. It also helps bring an understanding to why some practices used in certain areas fail when replicated in another. "That doesn't work out here" is an all-too-common phrase when trying to replicate results from one area to another. The brittleness scale is a way to identify how environments differ and in turn develop strategies to implement regenerative grazing in a manner best suited to that environment. The process must be adaptive (Callus, 2023).

The "normal" system in the western Riverina is described as winter rainfall although summer rainfall does occur from time to time, this is an opportunity. Dr Tim Steffens of Amarillo, Texas, remarked that this environment of low rainfall and low humidity is one of the most challenging to create meaningful change in through grazing. He emphasised that when summer rainfall does occur it is a huge opportunity to manage grazing in a manner that will promote the growth and establishment of perennial pastures. To get the most benefit from grazing it is essential to understand the plant growth phases.

Understanding plant growth phases

Phase one: Establishment/recovery phase:

- Growth: very slow.
- Leaf Area: minimal, so limited photosynthesis.
- Root system: recovering or just beginning; limited energy reserves.
- If plants are grazed in phase one there is a risk that plants are stressed and can be damaged long-term.
- Grazing should be avoided in this phase to let roots rebuild.

Phase two: Rapid growth/sweet spot:

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- Growth: very fast - optimal photosynthesis.
- Leaf area: abundant but not yet mature.
- Root system: strong, energy reserves are high.
- Grazing in this period promotes regrowth and soil health.
- This is the ideal time to graze; animals benefit from high-nutrition and plants can recover quickly.

Phase three: Maturity/Decline:

- Growth: slows down.
- Leaf area: maximum size, but leaves begin to die off.
- Nutrient value: drops - more lignin, less protein.
- Root system: strong but plant is redirecting energy to seed production.
- Avoid letting plants reach this stage too often - less productive and nutritious, encourages over-maturity.

In general terms the aim is to allow plants to remain ungrazed until they reach phase two and then graze in a manner that prevents the plant from entering phase three. During high growth periods this will mean higher intensity grazing with more rapid rotation allowing for shorter rest periods. Overgrazing occurs when plants are grazed too low thus damaging roots and limiting regrowth.

Plant growth will of course cease as moisture is limited, usually as the seasons change. At the end of the growing season, we are typically left with a stand of dry feed. The nutritional value of that standing feed will be determined by the growth stage the plant was in when it stopped growing. A plant that dries off while in phase two will provide more nutritious feed that is more digestible. A plant that dries off during phase three will be more lignified and less nutritious and digestible.

During the growing period grazing is managed to promote maximum plant growth. During the non-growing period animals are managed to essentially ration the available feed and assist in the breakdown of plants making nutrients available for the next growing season.

Understanding plant growth phases gives vital insight and a tool to best adapt grazing time and frequency. Which in turn promotes maximum plant growth and maximum grazing potential.

The Four Ecosystem Processes

1. Water cycle

Healthy cycle: Rain infiltrates, is stored in soil, feeds plants, minimal runoff.

Degraded cycle: Water runs off, erodes soil, carries nutrients away, little infiltration.

Practices that support it:

 Maintaining ground cover with living plants or mulch

 Improving soil structure through cover crops and grazing

 Slowing water movement with keyline design, swales, or contour farming

The aim is to keep more water in the soil and on the land, reduce runoff and evaporation. To quote Roland Kroon of South Africa, we must aim to “*stop the drop*”. We cannot control how much rain falls but we can influence how much we keep.

2. Mineral Cycle

Healthy cycle: Nutrients move through plants, animals, and microbes, returning to the soil to fuel new growth.

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Degraded cycle: Nutrients are locked up, leach away, or accumulate as waste.

Practices that support it:

Managed grazing (animal manure and urine feed the soil)

Compost and biological inputs

Reducing synthetic inputs that disrupt microbial activity

Regenerative focus: Ensure nutrients like nitrogen, phosphorus, and carbon cycle efficiently between soil, plants, animals, and microbes.

3. Energy Flow

Healthy flow: Diverse, green plants photosynthesize efficiently, feeding soil microbes and building biomass.

Degraded flow: Bare soil reflects sunlight; little biomass is produced.

Practices that support it:

Keeping ground covered with growing plants

Diverse pastures and crop rotations

Short-duration, high-density grazing to stimulate regrowth

The aim is to maximise solar energy capture through photosynthesis to drive productivity and soil health.

4. Community Dynamics (Biodiversity)

Healthy dynamic: Many species interact, balance pests, support soil life, and improve resilience.

Degraded dynamic: Monocultures dominate, pests increase, system becomes fragile.

Practices that support it:

Multi-species cover crops and pastures

Integrating animals into cropping systems

Encouraging native vegetation and beneficial insects

Grazing should support a diverse, resilient ecosystem of plants, microbes and insects.

All four processes are interconnected e.g.:

- better energy flow (photosynthesis) supports the water cycle (deeper roots = better infiltration).
- Healthy community dynamics improve the mineral cycle (fungi and bacteria mobilize nutrients).

Time, Area, Density

Time - how long animals are in a paddock

- Time in: how long animals graze a specific area.
- Time out: how long the area is rested before animals return.

Plants need time to fully recover after grazing. If animals return too soon, plants are overgrazed. If rest is too long in brittle environments, plants may senesce (go dormant) or die off. A focus must be on managing the recovery period, not just grazing.

Area - the size of the paddock being grazed

- Smaller areas allow animals to be more concentrated, which allows precise control over impact.
- Larger areas create less control, uneven grazing.

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Controlling the area helps ensure even grazing, manure distribution, and trampling of uneaten plants, which stimulates soil health and reduces selective overgrazing.

Density - how many animals per unit of area

- Measured as animals per hectare (or animal units per hectare).
- High stock density for short periods mimics wild herds and stimulates regeneration.
- High density causes even grazing and beneficial disturbance.
- Low density often leads to patch grazing and ecosystem decline over time.

The basic goal is to mimic natural herds in nature, large herds graze tightly packed for short periods, then move on and don't return for a long time. Regenerative grazing mimics this pattern to prevent overgrazing, stimulate plant regrowth, improve soil structure and water infiltration and cycle nutrients efficiently.

To have control over the time, area and density in which animals graze it generally means grazing systems are designed to have larger mobs or herds of animals rotating from paddock to paddock allowing for generally higher impact grazing followed by long periods of rest. Exactly how long to graze and how long to rest will constantly change depending on plant growth patterns. A useful guide picked up during a property visit with Laura Burandt in Perrington, Texas (Burandt, pers.comm., 2023) and reconfirmed in both Australia and South Africa was to aim for the below paddock numbers per mob:

- 8 - 10 paddocks to stop overgrazing
- 14 - 16 paddocks to support good performance
- Over 25 to get serious improvement.

Another light bulb moment was again during the land management course run by Roland Kroon. That is that over resting can be worse than overgrazing. Too often the focus is solely on the grazing period alone. When entering this topic with only a little knowledge it is easy to assume that the greatest enemy is overgrazing, however with a better understanding it is clear that over resting must be managed. Understanding how to properly utilise the tools of time, area and density will largely dictate the results from grazing.

Key concepts conclusion

The key concepts described are a regurgitation of textbook and classroom learning but are essential in understanding what is being seen on the ground. Most farmers learn best through seeing and experiencing technology in action however a good understanding of the key concepts and theory will also allow a manager to replicate what is seen. Further understanding when and how to appropriately adapt the technology into a different environment. Attending the RCS "*Grazing for Profit*" course in Australia, as well as Roland Kroon's "*Regenerative Land Management*" course in South Africa gave a great foundation of understanding to better appreciate and value the coming on farm learnings.

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Figure 2. Participants of the Regenerative Land Management course, South Africa (Source: Author, 2025)

On farm visits and real results

To practice regenerative grazing land managers are required to manipulate the movement of animals across the landscape in a manner that considers all of the key concepts. If done correctly the expectation is that pasture is utilized better, desirable plants out compete the undesirable and soils are healthier. The ultimate outcome is that soil health will improve however the key business outcome should be the ability to increase output of saleable animals. They aim is to sustainably increase the carrying capacity of our land. In higher rainfall and non-brittle environments, a focus is often on reducing input costs. In the more brittle and lower rainfall areas they are usually already characterised as being low input and would therefore require a sustainable increase in carrying capacity to determine the practice change as a success.

Several producers throughout the US and South Africa have successfully increased their carrying capacity through regenerative grazing practices. In the US on farm visits throughout Texas, Colorado and Wyoming identified several individual producers who reported an increase in carrying capacity of 1.5 to 2.5 times.

The tools of grazing and density

Sage Askin of Wyoming operated a grazing enterprise that under conventional management ran approximately 1,000 cow calf units. Under regenerative grazing the same area was running equivalent of 2,500 cow calf units. The tool of high animal impact and disturbance was used with success on this property. At certain times of the year animals were moved to a new pasture twice daily allowing for large mobs to graze and impact smaller areas at a time. The focus was not only on graze time and rest but also on density measured as pounds per acre. The introduction of sheep to this property was also the first opportunity to explore the use of different grazing animals within the system. As a tool the sheep were also yarded overnight behind temporary fencing to create extremely high impact on areas deemed to benefit from one off extremely high disturbance. With a large focus still on density, and although the sheep flock was still growing, Sage predicted that for the best outcome he would have an enterprise mix of 50/50 sheep to cattle by weight. This property visit really highlighted the power of high-density grazing (Askin, pers.comm., 2023)

Grady Grissom of “Rancho Largo” in Colorado operated a cattle grazing enterprise with cows and calves with direct market sale of fat animals. As with all regenerative grazing enterprise the grazing patterns change, however in general terms the cattle were rotated through 36 pastures spending 10-12 days grazing in each pasture. This allowed for rest periods of between nine and fifteen months for each pasture. Grady was able point out several species of plants that had once been lost but had since returned under his management. One example was a plant known as winter wheat. Interestingly, Grady had seen this plant return to the pastures and then subsequently begin disappearing again. For many years the cattle had been run as one herd with calves removed for one month to wean, then returned. One big mob allowed for maximum rest periods for the pasture. Due to the business needing to manage the demands of direct market sales the move was made to run two separate herds. With two herds now moving through the same number of pastures the rest period had effectively been halved. Instead of an average twelve-month rest period the pastures were now rested for a period averaging six months. The disappearance of winter wheat from the pastures coincided with the change in rest periods. This was an extremely interesting

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observation given one would think that a six-month rest period is still significant (Grissom, pers.comm., 2023).

Several other visits through the US showed significant gains and ultimately increased carrying capacities by 1.5 to 2.5 times. The general management practice was of large mobs allowing for short graze periods and long rest. Visiting Sage and Grady however really highlighted the two tools at play and how they were being implemented to different degrees but both with success. The visit with Sage allowed great observation and discussion around the value of high animal impact, grazing pressure coupled with soil disturbance. The visit with Grady showed the importance of rest on plant health.

Most farms visited in the US were running cattle only. The intention had been to focus more on sheep production systems within low rainfall areas and how they can utilise regenerative grazing. While the focus wasn't on sheep, the cattle grazing systems absolutely satisfied the question of how applicable regenerative grazing is within lower rainfall areas. Regenerative grazing practices were very successfully being used in areas of relatively low rainfall.

Sheep vs Cattle

With guidance from Charles Massey in Australia, South Africa was identified as the best place in the world to travel to find a similar production system to that of a merino grazing operation in the western Riverina (Massey, pers.comm., 2020). The South African karoo is an area of varying yet generally low rainfall that has, just as in many parts of Australia, been dominated by merino sheep production. Grazing is on native vegetation with a mix of grasses and low bush. They too went through the boom and bust of the wool industry decades ago. Merino sheep are still a major part of many grazing enterprises.

The purpose of this research was to find sheep farmers who were utilising this technology and creating a positive change in soil health, carrying capacity and financial return. Throughout South Africa several sheep farmers had successfully applied the regenerative grazing principles.

Sholto Kroon grazed a property to the west of Graaf Reinet. This area grew very little grass with grazing animals relying on shrubs and low bush. Without sufficient grass cover this area was deemed less suitable for cattle and therefore sheep and goats were the primary grazing animals. This property utilised a 48-paddock rotation. Overtime the carrying capacity had increased to 1.5 times the original level. An interesting observation was the return of some grass species. To all those in the area it was accepted that this area is one of shrubs and bush without any grasses. A journal entry from a soldier in the boer war was suggested it once had grass growing in abundance. One would assume the poor practices since have degraded the land to a point in which grasses are not able to grow. Using regenerative grazing, it appears some grasses had begun to return. This also highlighted the earlier point around the need to prepare soil conditions rather than worry about if the seed is available or not.

This visit also highlights a very important point around resilience through dry times. An increase in carrying capacity would suggest how many stock can be run under "normal" conditions. At the time of visiting this area had received well under the expected rainfall. In dry periods the regenerative grazing systems show far more resilience. In part because they can grow more grass per millimetre (mm) of rainfall but also because there are processes and tools in place that allow for good decision making (Kroon, 2025)

Regenerative grazing systems aim to manage dry periods through:

- Soil and groundcover that maximises water use

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- Attention to match stocking rate with carrying capacity
- Ability to better forecast when feed reserves will run out
- Willingness, ability and courage to destock when necessary.

James Brodie ran a grazing enterprise around 15 km directly north of Sholto. Although not far it was a very different landscape with a lot more grass species. The property ran sheep as well as cattle and was stocked up to three times the original perceived carrying capacity. This was one of the first opportunities to ask the direct question if it was possible to achieve such results when running sheep only. James was clear, and several others after affirmed this, that they would not be able to achieve the same results if they were running sheep alone (Brodie, pers.comm., 2025)

The key tools being used in these grazing systems are that of grazing with periods of rest and animal disturbance. It was often pointed out that these must be considered as two separate tools but are often confused (Kroon, S, pers.comm., 2025). Both cattle and sheep can be used in a time-controlled grazing system that allows for appropriate graze and rest times. The difference seems to lie in the ability to use the tool of animal disturbance. Cattle are simply heavier animals that can create greater soil disturbance. They are also less selective grazers offering better pasture utilisation. This being considered it is worth pointing out that most graziers who moved to utilise cattle had not, at the same time, dispersed their sheep herd.

As mentioned, several different farmers had improved their total carrying capacity by 1.5 to three times. To achieve the upper end of observed results this consistently required the use of cattle but also required a more focused and intense management style that is not always possible nor will it meet all individual appetites for such management. It is also worth pointing out that an observed increase in carrying capacity of 1.5 times is still seriously impressive and is a result that far exceeds most livestock operations globally.

For those who were able to utilise cattle within their grazing operation, a general trend was that they were able to maintain the size of their sheep flock and increase stocking rate by increasing cattle numbers. This was true at Brodie farming and as another example a property located in the southern free state were also able to maintain their original sheep flock and now run sheep to cattle at an 80/20 split by numbers. 80 ewes at 1.2 dry sheep equivalent (DSE) = 96 DSE and 20 cows at 8 DSE = 160 DSE. This is close to a 60/40 split in favour of cattle and if their property originally had the capacity to run the sheep only, then at the time of visiting they were running 2.7 times the original carrying capacity.

While many regenerative graziers were able to significantly increase their carrying capacity it is worth noting that at times this could translate to lower individual performance. This could take the form of young animals with a slightly slower growth rate or breeding animals with a slightly lower reproductive rate. Never to an extent that was a concern but still worth noting. In every case that downturn in productivity was easily outweighed by the increased number of animals. This also led to a shift in analysing performance not by individual but by output per unit of area.

With a focus on profitability the easiest measure has been to compare carrying capacity before and after regenerative grazing practices have been implemented. It is the ability to grow more grass when it does rain as well as the ability to develop more resilient systems when it is dry. The ability to flex in and out with the seasons is extremely important.

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On farm visits and real results conclusion

Moving from classroom learning to on farm visits delivered an appreciation on how the theory can be put into practice. There is a general formula, however each individual system has different opportunities and different constraints as well as different appetites for how to manage. The pastures and soils were notably healthier than that of any immediate neighbours, and their livestock were always in good health. Overall carrying capacity had improved dramatically time and again and in turn created financially successful businesses. While the stock, pastures, soil, infrastructure and overall systems were consistently impressive it was the individuals behind it all that were the most impressive. There were not many who could claim to be second generation regenerative graziers. Each individual had the courage and inquisitive nature that allowed them to explore, adopt and refine a technology that in many areas is still seen as a radical and non-traditional practice.

Putting it all into practice

The seven principles of profitable grazing management, as outlined in the Grazing management course held in South Africa (Kroon, R 2025), effectively describes what has so far been seen and what is required to achieve those results. The seven principles are:

1. Match recovery to growth rate
2. Match stocking rate to carrying capacity
3. Plan, Monitor and Manage your grazing (Holistic Planned Grazing)
4. Manage Livestock Effectively
 - a. Nutrition is the primary driver of production
5. Short graze period improves animal performance
6. Maximum density for minimum time
 - a. Density is regenerative grazing, but regenerative grazing is not necessarily density
7. Diversity of plants and animals creates stability.

So, what does it take to implement such a grazing system, after all the research and fact finding, what practically needs to happen on farm to get started?

Fencing

The basic requirement is that animals can move across the landscape at higher densities and then allow for extended rest periods. Lots of expensive fencing is the usual answer. From that it is worth exploring if there are cheaper fencing options and whether fences are needed at all.

There are three possible solutions to manipulate grazing animals without extra fencing.

- Constant shepherding by humans - if a stockperson or several stockpersons were able to constantly shepherd a group of animals it would give fantastic control over where animals grazed and for how long. With the right training shepherds would be able to constantly assess the grazing conditions and make instant adaptations to the grazing plan. But is this really feasible? Although not common place, this was a viable option in some parts of South Africa. In the US, Sage Askin had employed shepherds from Peru under a formal government visa program. They were a relatively cheap form of labour but also highly skilled shepherds. The shepherds were provided caravan style accommodation that allowed them to move camp as necessary, animals were yarded each night and then the shepherd would spend the day directing the animals through a combination of temporary electric fencing and constant presence. The idea is still easy to dismiss, yet in Australia we often see drovers employed to move animals along the travelling stock routes. Animals are rarely put onto the stock routes for the old purpose of getting from A to B. They are there because even after they pay the agistment rate and employ a drover, it is still a viable way to feed their stock.
- Virtual fencing - This technology is still emerging yet is already providing real solutions to parts of the livestock industry. The technology utilises collars on each individual animal that delivers a sound, vibration or electric shock as they come close to or cross a pre-defined line (virtual fence). Global Positioning System (GPS) or radio signal are used to define the customisable boundary and is usually controlled through a simple phone app. At the time of writing and as far as the author is aware the virtual fencing

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technology is currently used on cattle only with no current adaptations for other animals including sheep.

The technology was demonstrated on a property visited in New Zealand. It was being used on both beef cattle and dairy cows. Both were managed under intensive strip grazing of irrigated pastures. In the beef enterprise the collars provided a huge labour saving however at the time the manager reflected that the cost of the technology still exceeded the labour saving. In the dairy enterprise however the additional labour saving due to cows moving to and from the dairy shed made it a profitable use of technology.

As with many new technologies the cost will hopefully decrease with time and hopefully expand to use with other animals.

- Artificial Intelligence (AI) driven robot herders - developed at the university of Sydney, SwagBot is an AI driven robot that can herd cattle when needed and assess pasture health and animal health. It offers the potential to not only move animals across the landscape without fences but also collect information and make decisions about where and when animals should be grazing.

This technology is absolutely in early days of development but is absolutely an exciting prospect to hopefully one day assist in more productive grazing of livestock.

Livestock can be run regeneratively without physical fencing, to a degree, with current skilled labour and the use of emerging technologies. It is however still very much common practice to achieve grazing pressure through some sort of fencing, either permanent boundary style fencing, temporary electric fencing or a very basic but permanent electric fencing system. Or at times, a combination of all three.

- Permanent boundary style fencing
 - This may be a netting fence with a top barb or a five- or six-line plain wire with a top barb.
 - Relatively expensive
 - Very secure
 - Little maintenance
- Temporary electric fencing
 - One to four lines depending on animals
 - Cheap
 - Can be constantly altered
 - Requires constant labour input
 - Not always 100% secure
 - Limit to 1km stretch
- Permanent electric fencing
 - As little as one line for cattle, three lines for sheep
 - Cheap
 - Requires maintenance
 - Not always 100% secure

The use of different styles of fencing depends on individual preferences conducive to their management style and targeted grazing system. Permanent fencing is the most expensive and least flexible however is very secure and requires the least ongoing labour input. Kosie du Plessis in the southern Free State of South Africa ran a family enterprise with over 20,000 sheep and utilised permanent and highly secure fencing throughout. This enterprise had been expanding consistently over many years and with every new block of land came new fencing

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to make more paddocks for better grazing. Although the fencing style may have been the more expensive option there was no doubt of the increased production it would yield. Every block of land had a story of how many paddocks and how many stock it first had, to how many paddocks it now has and by how many stock it had increased. This system appeared to be very well structured with a formula they knew worked. Fence into smaller paddocks, control the grazing, grow more grass, run more stock. It allowed for time-controlled grazing with graze periods and rest periods. At the time of visiting, they were running stock at 1.6 times the previously accepted rate (du Plessis, pers.comm., 2025).

Much more intensive systems such as those run by Sage Askin in Wyoming or James Brodie near Graaf Reinet, South Africa relied heavily on the use of temporary electric fencing. Each property was set up with a certain number of permanent paddocks but then utilised temporary electric fencing to create any number more. James Brodie's property was originally 33 paddocks averaging 235 hectares (ha) and over time it was split into 140 permanent paddocks averaging 55ha. With the use of temporary electric fencing, paddocks could then be reduced to 2-5ha creating over 1,000 paddocks and each area getting only 1-2 grazes per year. The shift from smaller-to-smaller paddocks is essentially a system shift from time-controlled grazing to time controlled with high animal impact (high density). This system obviously requires more labour and intensive management however the resulting improvement in soil health, available grass and ultimately stocking rate showed a clear return.

Temporary electric fencing was being used to create an almost infinite number of temporary paddocks however each system still relies on a larger number of permanent paddocks. As discussed, the more expensive yet secure permanent boundary style fencing is used with success however if looking to further intensify the grazing system the total cost of fencing will escalate quickly and likely become economically prohibitive. A solution commonly used on visited properties in South Africa was to use permanent yet cheaply constructed electric fencing.

Permanent electric fence design for sheep:

- Three wires. Two live with one earth
- Wires spaced at 27, 54, 75cm
- Posts spaced 30 - 50m apart
- 10mm reo rod used as line posts
- Treated pine end post
- Stay on end post optional pending soil type
- Nemtek portable solar energizer with battery. Nemtek is a South African brand that came highly recommended as a quality product without the price tag of some of the competitors. Nemtek is available in Australia.

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Figure 3. Permanent electric fence in use on James Brodie's property, South Africa (Source: Author, 2025)

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Figure 4. Inspecting electric fence on James Brodie's property, South Africa. James Brodie top of image, Roland Kroon bottom of image.

The above-described design is just one example but could have any number of design variations. With a much cheaper permanent fence option, what may seem out of reach, especially in the more extensive environments, soon becomes possible.

Paddock design and water infrastructure

Paddock design is again a consideration of cost, effectiveness and desired system intensity. Countless hours are spent designing the best layout for each individual property. A good design will allow the best utilisation of pastures while considering fencing cost, labour requirements and the need for additional water infrastructure.

The wagon wheel design involves a central water point with fences leading out like the spokes of the wheel. This design allows for one water point to be used for several paddocks and was a design used to some extent on every farm visited. It is probably the most easily adapted to existing infrastructure.

A criticism of the wagon wheel design is that it does not always allow for the best pasture utilisation with paddock shape often representing a slice of pizza. It can also be less adapted to when wanting to create smaller paddocks or strip graze with temporary electric fencing.

Figure four shows how central water points can be utilised but without creating paddocks that are too irregular in shape. Temporary electric fencing can be easily used to further cut down paddocks. Stock access water by either walking back over the already grazed area or via a portable trough moved along the pipeline.

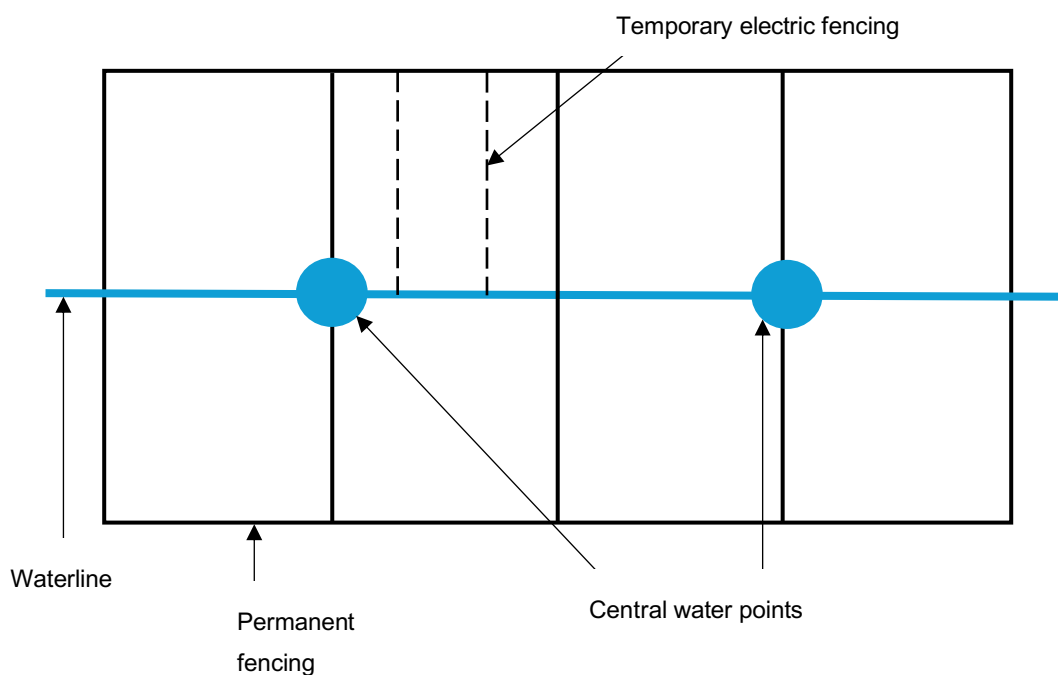


Figure 5. Example of central water points and electric fencing. (Source, Author).

Due to the nature of how these systems develop it is usually a slow process of cutting paddocks into smaller ones over time. New water points may slowly be added, or existing points utilised further by adding extra spokes to the wagon wheel. It is usually slow due to the learning process but also because of the capital outlay required to transform a property.

The process of splitting paddocks is often slow because of the need to find the necessary capital but also one needs to build confidence in the process. Rowan Stretton in the Molteno area of South Africa had doubled his carrying capacity by splitting paddocks smaller and smaller over time and running larger groups of animals. Paddock sizes ranged from 20ha to 100ha. He was aiming to double carrying capacity again on one part of the farm with an

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intensive purpose-built system. All original fencing was removed and replaced with electric fencing in a checkerboard pattern creating over one hundred paddocks at just over 6ha each. A high-pressure pipeline provided a hydrant accessible to each paddock and serviced a portable water trough. This system showcased the pointy end of paddock design. The investment in this system was done with full confidence it would create a net return and by observation it had already begun to produce fantastic results.

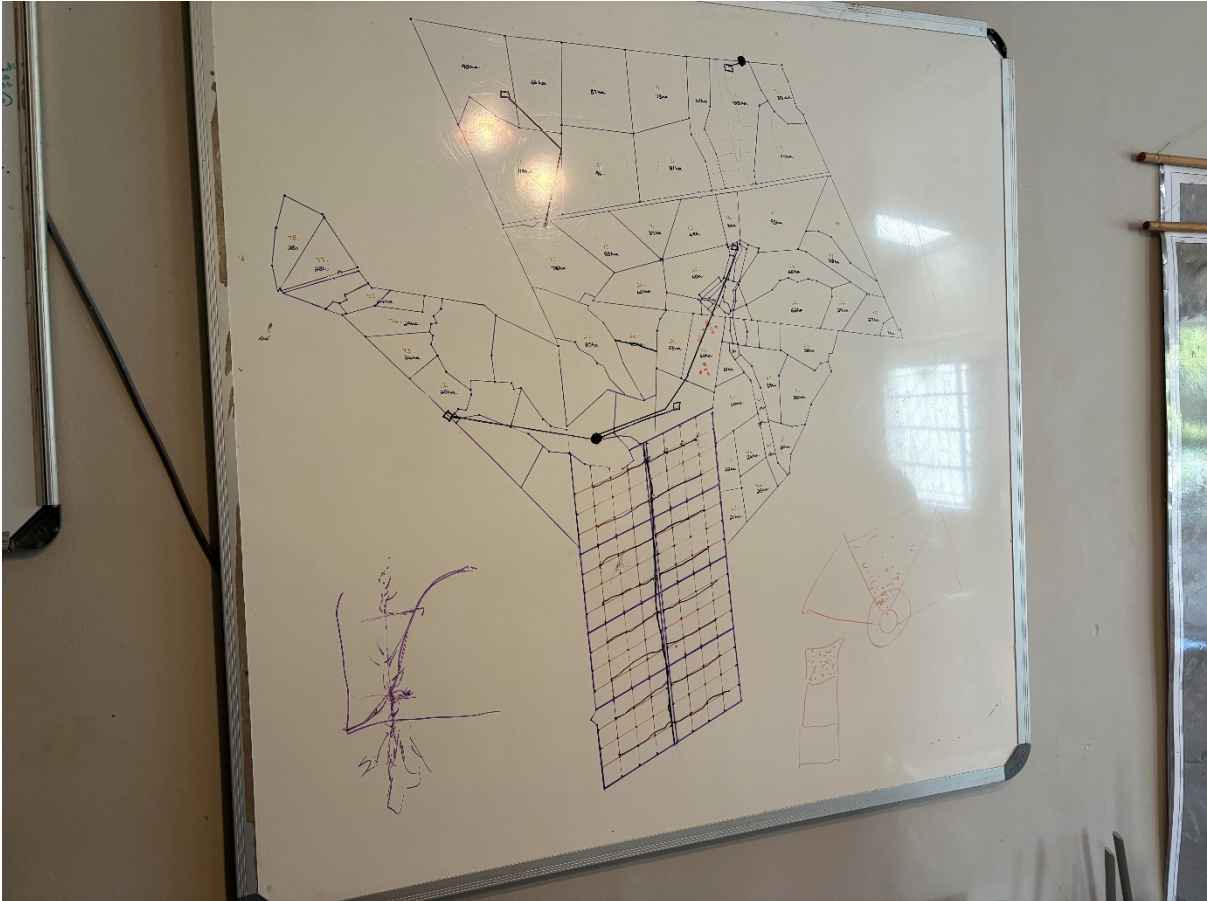


Figure 6. Rowan Stretton's property map showing southern area that has been re fenced into smaller paddocks (Source: Author 2025)

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Figure 7. Portable water trough, Rowan Stretton's property (Source: Author 2025)

When considering water infrastructure, the overwhelming advice is to ensure water can be delivered at a high enough flow rate. Trough size and designs vary however when watering large mobs it is always flow rate into the trough that is considered the most important. To that point the advice has been to, whenever possible, design a system that has greater capability than just what is needed to service the current demand. If demand currently dictates using 50mm pipe, then consider 63mm pipe instead.

Labour considerations

Much of the processes described are likely to increase the labour requirements within a grazing enterprise. Shifting stock more often is a labour expense so too is the maintenance on extra fencing, or the extra labour required to constantly set up and pack up temporary electric fencing. These additional labour costs must be considered. There are however some labour savings, including

- With fewer, larger mobs, there is reduced time spent travelling to each mob when doing any form of inspection, or trough run for example.
- A well thought out grazing plan can time stock to be grazing in paddocks closer to handling facilities when required. For example, if shearing is to be conducted at a known date it would not be difficult to time a graze closer to the shearing shed and save on mustering.

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- Stock that are constantly moving on to fresh pastures suffer from less animal health issues including worm burdens.

Matching stocking rate to carrying capacity

Regenerative grazing requires that stocking rate is matched to carrying capacity. This will mean increasing numbers when there is a lot of feed available and reducing numbers when feed availability is low.

A grazing enterprise needs the ability to move stock numbers up and down as feed availability changes. For many breeding operations this is largely supported by lambing or calving during the periods of high feed availability then selling down surplus stock before entering a low feed availability part of the year. This approach works in general terms however the rain does not always fall at the same time of year, nor does the same amount always fall. A regenerative grazing system requires flexibility in stock numbers. In simple terms, when feed availability is low stock must be sold, or alternatively agisted elsewhere. When feed availability is high, extra stock must be brought in. The structure of the flock or herd must allow for this flexibility. For example, if the entire business was based around breeding ewes and they were at the point of lambing when feed availability is deemed too low then you would be stuck with stock that cannot be removed and overgrazing would occur. Many grazing systems therefore rely on having only a certain percentage of their stock as breeders with the remaining percentage being a class of stock that can be more easily increased or decreased at any time. Options include

- Growing out wethers to either heavier weights and/or as wool growers
- Running steers out to heavy weights
- Taking on agistment stock
- Trading stock. Buying and selling of stock as the season demands

Which approach is taken depends on each individual business and how they think they can maximise their grazing system as well as financial return.

When considering trading stock, several South African farmers had mentioned that they had travelled to Australia just to attend the KLR marketing course. A number also proudly stated that with the skills they had made in that course they were able to make back all their travel expenses within their first trade.

The KLR marketing course offers skills to identify how to make money regardless of whether the market is rising or falling. It is also extremely well integrated with the principles of regenerative grazing. It focuses on what you should buy and when as dictated by the market but also what you should buy and when as dictated by your feed availability. A large focus is put on managing the three key areas of Grass, Money and Livestock.

Nutrition

Nutrition is the main driver of production. Regenerative grazing systems aim to create grazing patterns and soil conditions that allow for improved nutrition for animals by growing more grass of higher quality. There was also a large focus on “feeding the rumen”. A range of different supplements are used to assist the rumen function at an optimal level. This helps the animal best utilise the pasture available for their own nutrition but also assists in nutrient cycling of dead material, which is particularly important in brittle environments.

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McCosker brew is a urea-based supplement developed by Terry McCosker of RCS Australia. This brew or similar was utilised by almost every single regenerative grazer visited. Many, including Luke Bell of the Molteno area SA, claimed it as an absolute game changer when it came to pasture utilisation. It assists by optimising rumen activity on low protein, lignified stands of grass. It not only allows ruminants to access greater nutrition, but it also further assists the biological process of breaking down plants and cycling nutrients back into the soil. If animals were to enter a paddock with an abundance of dry rank feed, they are likely to go hungry while the plants struggle to breakdown. With McCosker Brew the dry feed is broken down and allows for further plant growth. There are several other supplements that can be utilised depending on need. In both the US and South Africa, a small number of producers were also utilising tannin inhibitors to encourage grazing of otherwise unpalatable plants. The point is that the aim is to feed the bugs of the rumen so the gut can best access the plants nutrition. Grass remains the primary feed source; it is just about how best it is utilised.

Many of the supplements are delivered via loose licks however a well-designed system could also deliver via water dosing. Urea based products can be fatal when wet and must be appropriately managed. Every property visited had different systems ranging from half cut drums to purpose built covered trailers to allow for the constant moving. When grazing both sheep and cattle consideration must also be given to their different needs. One solution was to have tubs at different heights, high for cattle access only, low with a guard rail to allow sheep only access.



Figure 8. Half cut drum used as loose lick container, Roland Kroon's property, South Africa (Source: Author 2025).

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Figure 9. Sheltered loose lick container with self-pivoting cover, Laura Burandt's property, US (Source: Author 2023).



Figure 10. Covered loose lick trailer, Rowan Stretton's property, South Africa (Source: Author 2025)

Adapted animals

At each property visit there was always a focus on using the right genetics or type of animal. They first need to be able to thrive within the chosen environment. In different ways the description always lent towards selecting an animal that can best handle local parasites, climate conditions as well as carry better energy reserves. This approach perhaps takes a step away from individual animal production traits, instead it focuses on an animal that best fits the entire system. A pioneer of this philosophy is the Pharo Cattle Company in the US. In today's merino industry this would equate to selecting for improved levels of genetic fat and muscle as well as a greater focus on welfare traits.

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Figure 11. Author inspecting rams with Kosie du Plessis, South Africa (Source: Author 2025)

Conclusion

Regenerative grazing has been implemented over and over again in low rainfall, rangeland type environments, in many parts of the world, with astonishing results. There are few, if any, practice changes that can be implemented to a grazing system that can return such improvements to carrying capacity and total farm profit. The aim was to identify sheep grazing enterprises in low rainfall areas that had utilised the system. Businesses running just that scenario were identified and proved to be generating a significant and profitable increase to their carrying capacity. Regenerative grazing is a holistic process that considers a range of ecological and biological processes. Livestock, and how they interact with the land, are the key tool.

Every environment and indeed every individual grazing enterprise will differ. There are several key concepts that must be understood to properly apply the tools of regenerative grazing. This includes an understanding of how each environment is unique, and the ability to be adaptive as the environment shifts from season to season and year to year.

The other major question this research aimed to focus on is the differing level of success or failure when applying regenerative grazing to a sheep production system as opposed to cattle grazing system. Sheep only, or at least sheep dominated, systems can utilise regenerative grazing systems with success. It was however evident that the use of cattle within a regenerative grazing system returned substantially improved results.

Recommendations

A sheep dominated grazing system can utilise the principles of regenerative grazing however it is recommended that cattle also be utilised, if possible, to create a greater positive change. All regenerative grazing systems must consider and adapt grazing to their unique environment. Much of the observed results from abroad were in low rainfall areas similar to the western Riverina of NSW. A key difference however is that many of the visited area had their rainfall and growth period through the summer months, as opposed to the mostly winter dominant system of southern Australia. The same tools can be utilised across all grazing systems, your own environment and indeed circumstances will dictate how and when each tool is used.

A relatively universal recommendation was to first focus on the most productive part of your farm. Productive land can become even more productive easier than trying to restore degraded land. It was also recommended to begin by altering the grazing method on just one part of your farm and observe the results before expanding the methods out further. Move onto the more difficult areas once your systems are refined.

It is not recommended to shift an entire farm over in one hit however it is suggested to not start too small. Begin with the intention of success and with meaning “you sometimes do need to test the depth of the water with both feet” (Brodie, pers.comm., 2025).

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