

salt

magazine

The Magazine of the Future Farm Industries CRC

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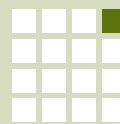


Perennial
pastures protect
and provide



FUTURE FARM
INDUSTRIES CRC

Personal stories
of Australians
reaping the
benefits of
profitable
perennial
farming systems



Welcome to SALT Magazine

Welcome to a new year and a new look *SALT Magazine*, the first issue to be published by the Future Farm Industries Cooperative Research Centre (FFI CRC). As a CRC dedicated to developing new farming systems for prosperity through the use of perennial plants, we are delighted to take ownership of *SALT Magazine* and continue the commitment of spreading the word on how they have successfully managed salinity to farmers.

My former jobs as CEO of the Cooperative Research Centre for the Plant-based Management of Dryland Salinity (CRC Salinity) and Chair of the National Dryland Salinity Program have made me very aware that since the magazine's inception almost ten years ago, it has developed a loyal and extensive readership. Its readers have made it the largest magazine in the country dedicated to addressing the salinity threat. The size of the magazine's distribution itself (11,500) is a reflection on how well regarded the publication is among farming and research communities.

Still with my old CRC Salinity hat on, I would like to acknowledge the important research done by the CRC, but more importantly, I would like to personally thank the farmers from around the country who have allowed the former CRC Salinity communication team for the last four years to interview them, so our readers can gain practical insights to the perils and pleasures of tackling salinity on their properties. Without their contributions there simply would not be this magazine.

With the creation of a new CRC, comes a new name and despite the word 'salinity' disappearing from the title, this name change does not diminish the importance that FFI CRC places on addressing salinity. Even though climate change and water have become major concerns for Australia in recent years, we are very aware that salinity remains a serious environmental problem, and that successes in managing it will generate other benefits for drought adaptability, water resource management and increasing biodiversity.

Therefore in our minds, it's essential that *SALT Magazine* continues the tradition of communicating relevant experiences and successes in salinity management by showcasing farmers and their practices, which are underpinned by good science and economic analysis. Our other magazine, the newly created *Focus on Perennials*, previously known as *Focus on Salt*, will also continue to play an important role in communicating the latest in salinity management research through its profiling of work-in-progress on perennial plant-based farming systems.

I hope you continue to enjoy *SALT Magazine* and we look forward to bringing you interesting, exciting and innovative stories of how farmers have turned a negative into a positive by making money from perennial-based farming systems and effectively managing their salt-affected land.

Kevin Goss

FFI CRC Chief Executive Officer



The Hon. Julie Bishop, staff and researchers celebrate the launch of Future Farm Industries CRC on July 9 2007.

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FFI CRC is a unique co-investment between meat, grains and wool industry research corporations, the Landmark agribusiness company, and the combined research power of CSIRO, six State agencies and four universities.

For further information about FFI CRC visit www.futurefarmcrc.com.au



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Our cover

Derek Blomfield is thrilled with the benefits of native perennial pastures.

- See full story 12.

Photo: Ben White

Prospects for profit from saltland

Until relatively recently salinity and waterlogging presented farmers with problems that often seemed too difficult or too costly to overcome. Now farmers across Australia are discovering that saltland, properly managed, opens new opportunities for profitable agriculture.

The latest *Prospects Statement* to be released by the Future Farm Industries CRC (formerly the CRC Salinity), *Saltland Prospects*, captures the existing knowledge base about saltland and uses it to outline the prospects for managing saltland across Australia. Leading producers, their advisers, industry networks, natural resource management groups and research investors alike can use this knowledge to inform investment and management decisions in respect to saltland on farms, across catchments or within program investment portfolios.

Responding to the need to assemble and interpret a wide range of important research findings, the FFI CRC has developed a series of *Prospects Statements* for people who need to base natural resource management decisions on good science.

What are the prospects?

The economic prospects from managing saltland are good, and in some cases even excellent, depending on regional, local and property characteristics, the level of salinity, the plant systems selected and the management attention paid. However, there are no profitable options for saltland

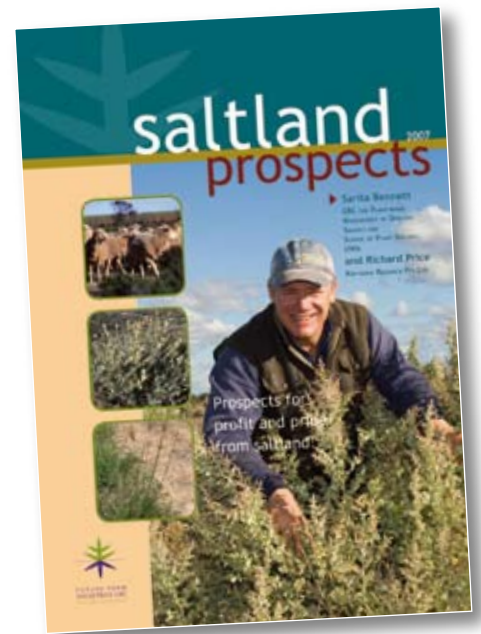
of the lowest capability, which should be fenced off and isolated from production.

The primary economic benefits derive from livestock production. Improving saltland and managing it as part of a whole-farm system can enhance the robustness and flexibility of an enterprise, providing additional grazing options and offering significant financial returns through higher stocking rates. Saltland pastures and fodder can help diversify the feed source both spatially (across the farm) and temporally (over seasons). In particular, saltland pastures can provide quality feed in summer and help fill the autumn feed-gap.

Returns from saltland pastures can be realised across a range of landscapes, rainfall zones and salinity levels.

The ecological benefits from appropriate management of saltland can be seen through improved biological function, structure and species composition. Appropriate management, such as providing groundcover where land is particularly degraded, will result in improved water management, landscapes and biodiversity.

Saltland pastures show high potential for large-scale improvement of saltland conditions and for subsequent delay or abatement of further downstream degradation problems.



For many successful saltland managers the real benefit is social. Farmers frequently describe the enormous sense of pride they feel when visual amenity is greatly improved. Organisations that support both agriculture and natural resource management now recognise that the two issues are not trade-offs and as a result the support mechanisms for sustainable agriculture are increasing. From a community perspective, the notion of productively using saltland carries less environmental stigma and public criticism than it once did.

Saltland Prospects follows *Integrated Forestry on Farmland* and *Lucerne Prospects* which were published in the past 12 months. Another *Prospect Statement* is planned for 2008.

Key points

- Saltland can be utilised for profit
- Features new national saltland classification system
- Email: greg.madson@futurefarmcrc.com.au for a copy.



Perennials a key to achieving the impossible

Wes and Margaret Seeliger have defied the ‘experts’ who have forecasted that there is no future for dairying in the Adelaide Hills. Having recently retired, but still living on the farm, they have passed responsibility to the fifth generation of Seeligers — son Steven and his wife Verica. Wes showed Bruce Munday around their sustainably productive property at the top of the Barossa Ranges in October which has been subjected to the second successive year without a Spring season.

“When I took over the farm in 1965 we had sheep, dairy, vines and poultry. Today we are dairy specialists, our last major change being to remove 16 hectares of vines, which is ironic because the property is now surrounded by vines!

Being dairy specialists means we are pasture specialists, and pasture management does not fit well with vineyard management — they both demand your attention at the same time.

The few thriving dairy operations remaining in this area owe their success to dedication and to well-managed perennial pastures.

My interest in pastures goes right back to when I left school in 1954 and started my own plot trials with different species. It wasn’t long before Dad also became interested, and he was one of the first in the district to recognise the importance of soil nutrients, particularly phosphorus and

Case study: Wes and Margaret Seeliger

Location: Flaxman Valley, Barossa Ranges, South Australia

Property size: 560 ha plus a further 60 ha leased

Mean annual rainfall: 670-740 mm, (varying across the rain shadow)

Soils: Sandy loam over clay, pH 5-6 (CaCl₂) depending on where in the liming cycle

Enterprises: Westdama & Esjay Holstein Friesian stud – milking 380 hd all year; 80 dry cows; 100 mated hfrs; 150 yrls; 65 calves



Photo: B Munday

Wes Seeliger with hay cut three weeks early (on account of negligible spring rain) on land that was originally too salty to grow pasture.

molybdenum, and soil acidity. That was the start of a professional approach to pastures that continues with our sons today.

In those early days the advice from the department of agriculture was to ‘sow one inch deep’ — advice that led many farmers to give up on pasture improvement. We soon learned that it was far more effective to simply broadcast the seed and follow with pasture harrows — today this has given way to sod seeding after spraying out.

Perennials — always there

The foundation of our pastures has always been the perennial grasses — mainly cocksfoot, phalaris and perennial rye — with sub-clover. South Australia’s Mediterranean climate encourages many farmers to think of a growing season that starts in April and ends in October (if we are lucky!). But every year we have summer storms, and every year

the perennials respond. On the other hand, annual grasses would just deteriorate with the rain and leave you with not much more than a fire risk!

Last year rain in late December carried our perennials through until a big rain on the 20th of January. On the strength of this we had green feed right up until April. We didn’t hand feed any dry stock over summer in a year when most graziers were feeding every week.

Such a big rain in January is unusual, but a false autumn break is certainly not. Perennials not only insulate us from this, they also bounce away as soon as the season does open properly. At the other end of the season we often get terrific regrowth after we have cut and baled our hay.

If perennials are so good, I sometimes wonder why more people don’t grow them.

Key points

- Managing land according to its capability gives perennials their best chance
- Rotational grazing is essential for long-lasting perennial pastures
- Perennials greatly expand the growing season.

But the reality is that they are a relatively significant investment so they need to be treated with care. A lot of farmers have spent a fair bit of money on perennials but have not much to show for the investment a few years later.

We learned way back at the start that soil fertility and pH are very important. Our natural phosphorus levels are about 12 parts per million, whereas we try to keep it at about 35 ppm. The pH can get down to about 5 (in CaCl_2) on account of the acidifying effect of the clovers, so we have to remedy that with lime about every ten years. Given that phalaris and cocksfoot seed can be expensive, the payback time might be several years, but we have some excellent paddocks that haven't been reseeded since the mid 1970s.

The secret is of course to look after it, and more than anything that means don't flog it with stock. Set stocking is a recipe for disaster and I am sure that most perennial pastures around here that don't survive because the plants never have a chance to recover from hard grazing.



Photo: B Munday

Some of the Westdama herd on dryland perennial pasture in the second year of drought.

Weeds are always a threat, particularly broadleaf weeds following summer rain. We work on the principle that the best way to beat these weeds is to crowd them out with a thick pasture.

Annual grasses such as barley grass and silver grass are gradually creeping in to a couple of paddocks. We will get rid of

these by spraying with paraquat in autumn at a rate that doesn't kill the perennials. We still have good perennial pastures that were sown 30 years ago — the secret is, we have looked after them.

One paddock we bought back in the 1960s was waterlogged and salt affected over about one third of its 25 ha. We were able to establish Demeter fescue and strawberry clover on this land and eventually the water table receded enough that we could renovate with phalaris, cocksfoot and sub-clovers so that now we cut hay from the whole paddock.

A paddock we bought in the 1990s was overrun with Guilford grass and so waterlogged that I bogged three tractors. Now, with a live root mass and good soil structure the whole paddock is highly productive with no boggy areas at all."

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The science behind the story

By Tim Herrmann

The Seeligers have always had some of the best perennial pastures in the district and there is no doubt that much of their success comes from getting the basics right.

Given the benefits, it is surprising that more farmers don't base their pastures on perennials. However, there is no escaping the fact that pastures need to be well managed to recover the cost of establishment and continue to contribute to farm profitability.

The underlying principle that Wes uses on his farm is management of different areas according to their capability. Wes began fencing according to land type when he started working at home with his father. In fact he was managing the property according to land capability long before the terminology was developed to describe it!

Wes has acquired neighbouring properties that were often run-down, and by using the best perennial species/cultivars for the site, sound soil nutrition and rotational grazing, he has turned them into highly productive

paddocks. With his rigorous approach to best practice Wes has overcome problems such as waterlogging and salinity that many landholders would have just given up on.

Managing pastures and grazing based on land capability is reflected in the high quality, production and longevity that the Seeligers obtain from their pastures. Even in the 2006 drought, they made 450 large rolls of top quality hay. One year they actually cut 2500 rolls! Feed tests have shown this hay to be as good as silage, but without the risk of botulism, the extra cartage and the disposal problems of the plastic wrap.

The Seeliger farm makes extensive use of shelter belts. While some farmers are reluctant to 'give up' productive land for trees, animals sheltered from cold winds need less feed, and pastures sheltered from drying winds are certainly more productive.

Wes has built his house and most farm buildings using radiata pine from the first shelter belts. Interior cabinet work was all made from brown stringybark — quite a

bonus from a shelterbelt!

Another highlight of the Seeliger property is eight hectares of superb, pristine native vegetation. From a purely business perspective Wes is not disadvantaged by this 'luxury' because he gains optimum production from the rest of his land.

As research delivers superior perennial varieties and cultivars, and develops more efficient management practices, progressive farmers like the Seeligers will continue to prosper and still be able to set aside some land for the environment.

• Tim Herrmann, Team Leader, Soil & Land Management Services, Rural Solutions SA.

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Pasture cropping reaps financial and environmental benefits

During the early 1990s, Colin Seis started to question the value of various ‘conventional farming’ practices. He became particularly skeptical about the wisdom and benefits of destroying and rebuilding pastures to accommodate cropping and grazing cycles. As Colin discussed with Mark Filmer, over a beer he and a mate devised an alternative farming system known as pasture cropping. This system has improved the profitability and sustainability of his own property and has gone on to be adopted by many farmers throughout Australia and overseas.

“A devastating bushfire during 1979 sparked a major change on *Winona*.

Earlier that decade, we started to experience increasing soil acidity, weed invasion and a rising saline water table. The bushfire, which destroyed the family homestead, more than 3000 sheep and most of our fences, forced us to rethink the way we had been farming.

During the late 1940s, my father implemented a pasture improvement program using sub-clover, ryegrass and superphosphate to help address erosion problems. The program worked well for about 30 years — helping to increase our

Case study: Colin Seis

Location: *Winona*, Gulgong, central west NSW

Property size: 810 hectares in family partnership

Mean annual rainfall: 650 mm

Soils: Mainly granite soils, pH 5.5

Enterprises: Merino stud, fine and medium wool growing, cropping (cereal rye and oats) and kelpie stud



Photo: M Filmer

Far from reducing crop yields, pasture cropping has maintained yields and increased profitability through reduced inputs for Colin Seis, *Winona*, NSW.

Key points

- Pasture cropping is a low input farming system that combines grazing and cropping into a single land management system
- Restoring original native grass cover is critical to the success of pasture cropping
- Pasture cropping requires a different mindset compared with conventional farming methods.

carrying capacity. But during the 1970s, when the other environmental problems began to emerge, superphosphate prices skyrocketed, making it uneconomical. The ‘improved pasture’ system, that relied on introduced grass species and fertilisers to replace native pastures, lost by a variety of means, no longer was the best form of management.

We started to consider how to secure financial and environmental sustainability. For many years we used conventional no-till farming methods but I remained frustrated at the reliance on herbicides to facilitate the change between the pasture and cropping phases. It seemed absurd that pastures had to be destroyed and re-established to allow cropping and grazing cycles to take place.

During the early 1990s, a friend and local farmer, Darryl Cluff, and I got together to discuss options to combine grazing and cropping into a single system. We devised pasture cropping — a low input farming system involving the direct drilling of a cereal crop into an existing native perennial pasture.

We had a fair bit of red grass (*Bothriochloa macra*) and thought we could direct drill a crop into it without killing it because of its winter dormancy.

It was far more successful than we expected — the crop was as good as a conventional crop.

That first ‘trial’ planting was an oat crop to fill the winter feed gap. Its performance suggested that good grain yields also could be achieved using the same method.

During the past 15 years we have refined the system and use it in combination with high-density short-duration (pulsed) grazing. Financial returns have increased and the property's natural resource base has improved.

The livestock picture

We currently stock about 4000 sheep, which are split into two mobs. Carrying capacity of the property is about 8 DSE/ha.

The mobs are placed in one of about 70 paddocks (averaging about 20 ha) where they graze for about 4–6 days before being rotated to another paddock — a process that creates a rest period of up to 90 days before each paddock is re-grazed.

Although the system combines cropping and grazing, the focus is more on plants than animals.

We try hard not to graze a paddock until it has recovered from the last grazing. This usually means a 2–3 months' rest before regazing.

You do need more paddocks to manage this system well, but it is actually less labour intensive as you only have to manage one or two large mobs rather than 10 or 15 smaller ones.

Better diversity and density

Short-term intensive grazing has improved the diversity and density of our native perennial grasses.

What we have done is to restore the original grassland and when you have done that everything starts to fall into place.

Year-round groundcover reduces wind and water erosion and weeds, improves soil structure and increases nutrient availability and soil organic carbon levels. As well as enhancing soil health, it also improves water-use efficiency, nitrogen-use efficiency and general ecosystem functioning.

Researchers have measured much higher biodiversity of insects and soil micro-organisms on our property compared with neighbouring farms using conventional cropping and grazing methods. This has contributed to less crop insect and disease problems as pest insects are controlled naturally by predators.

There also is evidence that retaining perennial native grass in grazing and cropping systems and having complete groundcover throughout the year increases plant biomass compared with conventional cropping methods. The extra biomass and perennial native grass are significant contributors to the increased soil carbon levels.

Sheep graze a pasture right up until a crop is sown. This process controls weeds, reduces dry matter bulk and minimises the need for herbicides.

Our cropping enterprises have been just as productive as before, but we now use significantly less inputs, increasing profitability. Increases in soil fertility with this systems means we now apply about one-third of the fertiliser used in comparable no-till systems

Following harvest feed is immediately available to livestock. In fact, it appears that pasture cropping stimulates increased grass seedling numbers and diversity, producing more feed post harvest.

Pasture cropping recognises that natural ecosystems are complex. Through mimicry, a potentially valuable tool that can improve the financial and environmental outcomes of mixed-farm systems can be implemented.”

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The science behind the story

By Dr Alison Bowman

'Roughing' cereals, particularly oats, into pasture paddocks has been a technique used by Australian farmers for decades to provide early season fodder to livestock. Yet rarely do these crops go through to grain harvest unless the season is particularly favorable. 'Pasture Cropping' is actually an optimisation of the system that allows a fodder supply plus a grain harvest from cereals sown into native pasture country through better management of both the crop and the pasture component.

With increasing pressure on dryland farming systems to reduce input costs in the current run of drought years, low input options such as pasture cropping are more attractive to growers. At the same time the Future Farm Industries CRC (FFI CRC) is looking to test farming systems that could better cope with

changes to climate by adding more perennial options to the system. The combination of pasture cropping into this range of new perennial options is a research area which the CRC will invest in.

One of the options researchers will trial across a range of rainfall zones in southern NSW and northern Victoria in the next few years will be the performance role of a number of annual cereals oversown into a range of perennial pastures. These pastures will include native perennial grasses, similar to those on Colin's property, as well as lucerne and other perennial broadleaf plants, and a range of new domesticated perennial grasses. FFI CRC is endeavouring to find answers to the questions growers are asking such as: 'How long does it take before a perennial-pasture systems degrade,' and 'Can you quantify the yield penalties to the

crop or pasture?' To date the information, even though mainly anecdotal, has been favourable. The CRC intends to provide management packages for growers wanting to use these types of systems along with risk management advice for those who intend to implement them in the various rainfall zones.

- Dr Alison Bowman is the Program Leader for the Future Cropping Program (Program 2) within the FFI CRC.

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Saltland management yields high-quality results

The incorporation of saltbush and a mix of subtropical grasses and lucerne is lifting production on Gary and Kerry Butcher's mixed farming operation, *Elena*, as they explained to Brianna Peake from the Liebe Group.

Gary, Kerry and their son, James operate a mixed farming operation near Pithara in WA's mid-west.

Gary is a third generation farmer and generally crops 2,200 ha in a wheat pasture rotation as well as running 1,300 Merino ewes in a self-replacing flock.

"We lamb down our ewes in June and reduce stock numbers before summer by culling dry ewes and poor weaners," explains Gary.

"This enables us to carry the maximum number of sheep possible over the summer period.

We carry our wether lambs through to an appropriate weight for the lamb market but may sell some of these as shippers if the year is poor and they cannot achieve the required weight gain.

Each year we cull 25 per cent of our weaner ewes to get rid of poor wool types. But if we keep these 25% they are mated to terminal sires, along with five year old ewes and their crossbred offspring can be sold earlier than pure-bred lambs as they can gain weight faster.

Case study: Gary and Kerry Butcher

Location: *Elena*, Pithara, Western Australia

Property size: 2800 ha

Mean annual rainfall: 300 mm

Soils: Salmon gum to sandplain

Enterprises: Mixed farming – cropping and sheep



Photos: Grain & Graze

Gary uses this area as a safe lambing environment with saltbush rows and sub-tropical perennial pasture inter-row. INSET: Gary and Kerry Butcher.

The other 75% of the Merino ewe weaners are mated to Merino rams for the next four years.

Our aim is to produce both high-quality wool and meat from our sheep and so therefore target both markets.

Cropping strategy

The long-term average wheat yield for *Elena*, since the adoption of minimum tillage during 1993 is 1.7 tonnes per hectare. However the average wheat yield for 2006 was reduced to 0.75 t/ha, when only 158 mm fell during the growing season (Apr-Oct).

Our family has experienced drought conditions for two years during the past five, which has bought their five year wheat yield average to 1.14 t/ha, highlighting the importance of livestock in the enterprise mix.

Although wheat is the biggest income earner in the district, we use stock to reduce risk, diversify income and control weeds.

Throughout the year, sheep are run on a variety of volunteer and improved pastures, as well as crop stubbles.

We usually sow about 400 ha to Caliph medic and Cadiz serradella on an annual basis and in the past two years have been sowing the Cadiz in a mix with oats and a further 200 ha of oats alone.

Many growers within our region have started sowing grain oats to provide early feed for stock and to defer grazing on newly sown or germinating improved pastures.

This was common practice in years gone by, but has become less so during the past 10 years. Growers have reverted back to grazing oats such as Pallinup, as they are not getting the early season bulk needed from improved legume pastures.

When the oats grow past ear-emergence they become unpalatable, forcing stock to eat the weeds and so providing another tool in the integrated management of weeds.

Key points

- Management methods maximise both wool and meat quality
- Saltbush has increased lamb survival
- Perennial grasses are providing a productive substorey of feed.

Improving saltland

Elena lies within a salt lake system that flows into the larger Ballidu Lake system. Consequently, the property has 1100 ha of salt-affected country. We have long been advocates for landcare.

We can see the benefit of improving saltland for grazing and since 1997, we have sown 60 ha to saltbush. The established blocks of saltbush have proved to be useful in filling the autumn feed gap as well as providing shelter at lambing time.

Saltbush paddocks are small so ewes are not far from water, which reduces the risk of separation from lambs.

Saltbush is a valuable part of our system and has helped to reduce lamb deaths by providing protection from the elements.

We also have sown a mix of sub-tropical perennial grasses and lucerne in the inter-row of the saltbush alleys. The mix was sown in September 2005 and is well established.

This district is not traditionally one where perennial grasses have been grown in the past.

But they are surviving and providing a good substorey and additional feed to the saltbush. The results have been so successful that we will continue to expand their areas of saltbush over the next five years*.

* The details featured in this case study were as per the end of 2006 and some details may have changed due to the ongoing drought.



- The Butchers are one of 18 demonstration farmers in Western Australia's Northern Agricultural Region (NAR) participating in the Grain & Graze program. One of nine Grain & Graze programs nationally, the NAR project involves four farmer producer groups — the Mingenew Irwin Group, the Liebe Group, the Evergreen Farming Group and Victoria Plains Landcare Group.

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Science behind the story

By Brianna Peake

One of the project objectives of the Northern Agricultural Region Grain & Graze project is to collect grazing records from the 18 focus farms in order to provide an overview of the feed resources growers have available and how these are being utilised.

This information allows the project to further focus on the feed resources providing most value to the farm and identify where growers can potentially be better utilising these feed resources.

Gary has been collecting grazing records for the project since the middle of 2005. The analysed results of Gary's records are shown in the table on the right.

The main saltland fodder shrub findings show that areas sown to saltbush increased slightly from the 2005 to the 2006 season.

In addition to this about another 30 ha was planted to saltbush during 2007 and Gary plans to continue sowing saltbush areas to provide a drought proofing mechanism in the future.

Even though the current figures show that saltbush, bluebush and perennial areas only account for 1-2% of farm area and value, this value can be significant at the right time of year and in drought conditions.

During the dry spring of 2006, the stocking rate on the saltbush/perennial areas was 1.5 DSE/ha higher than on the next most heavily stocked feed source which was a mix of

Summary of grazing records for the period of June 2005 to May 2007

June 05 – May 06					
Feed type	DSE/ha	Total DSE grazing days	Area (ha)	% Total area	% Total grazing days
Volunteer pasture	4.1	339,480	226	9	31
Caliph medic	1.4	81,693	158	6	8
Cadiz and oats	2.5	248,489	267	10	23
Oats	1.0	82,804	231	9	8
Crop stubbles	0.3	211,666	1907	65	19
Saltbush	0.8	2,304	8	0	0
Saltbush and perennials	0.5	4,064	22	1	0
June 06 – May 07					
Feed type	DSE/ha	Total DSE grazing days	Area (ha)	% Total area	% Total grazing days
Volunteer pasture (VP)	1.2	327,058	721	29	40
Medic and VP	1.3	60,458	128	5	7
Medic	1.3	159,939	334	13	19
Oats harvested/hay	0.5	51,583	268	11	6
Saltbush and perennials	1.1	9,055	22	1	1
Saltbush/bluebush	0.1	1,593	33	1	0

medic and volunteer pasture.

- Brianna Peake is the Executive Officer for the Liebe Group. The aim of the Northern Agricultural Region (NAR) Grain & Graze project is to maximise farm profitability through the successful integration of perennial

pastures into the whole year feed resource, complementing grain and annual pasture production. For more information, visit: www.grainandgraze.com.au

Lamb on Mallee menu

Farming in the South Australian Mallee has never been for the fainthearted, and Mallee farmers are certainly no strangers to drought. However, when Rex and Cely Spinley bought their farm in 2001 they could have been forgiven for not anticipating three extreme droughts in their first six years and a major crop loss to frost in a 'normal' rainfall year. The Spinleys have a vision for their farm which runs counter to the prevailing custom of the region. As Rex explained to Bruce Munday, there are still many hurdles to get over and no doubt more lessons to be learned, 'but if it doesn't kill you, it makes you stronger'.

"We came to *Karnunka* from a non-farming work environment, but with a pretty clear picture of what we wanted to achieve. Fundamentally we wanted a farm that would be ecologically sound, economically viable, not too labour or capital intensive, and an attractive place to live and work.

Running only a cropping enterprise on a property of this size was never really an option given the likely overheads. And anyway, our real interest is in livestock and grazing systems.

When we bought the property it was quite run-down, with scarcely a tree to be seen, sandy ridges that would blow in summer, high weed burden and low soil nutrient and carbon levels. It seemed to us that a priority for sustainable farming in this environment is to keep cover on the soil at all times. In a grazing context that means carefully managed perennial pastures.

Case study: Rex and Cely Spinley, *Karnunka*

Location: Karoonda, Murray Mallee, South Australia

Property size: 760 ha

Mean annual rainfall: 333 mm, 204 mm in growing season (2006: 259 mm, 102 mm)

Soil: Sandy loam with deep sand on ridges; pH ~7 (CaCl₂)

Enterprises: Cereals, prime lambs, wool



Photo: B Munday

The challenge has been to establish and maintain a perennial grass with the lucerne to crowd out the annuals.

We both completed the *GrazingforProfit*[™] course in 2005, which reinforced our planning and warned us of most of the pitfalls. Everything we heard and read about perennials stressed the importance of not grazing too hard and then spelling the pasture to allow the plant to recover. Based on all the information we had absorbed we accelerated our cell grazing trials into a full enterprise management system.

We have divided about half the property into eighteen rectangular paddocks, roughly following soil type, each about one kilometre long and 250 to 350 m wide. These can then be further temporarily subdivided into 90 x 2-3 ha cells using portable water troughs and electric fencing tapes. The sheep are boxed into a single mob (except during mating) and are moved to a new cell each 1-4 days

depending on the bulk of pasture. Each cell is then spelled for 90-120 days.

This might appear to be labour intensive, but the system is really very simple. Bore water is reticulated to all cells and a plastic trough is moved to the next cell's faucet, 200 m down the service line, each time the sheep move on. The electric tape fence takes about 30 minutes to move to the next pair of permanent end posts. We know people who pay to go to a gym for this sort of daily exercise!

Each paddock has 10 metre access for machinery when the pasture needs renovating or if the paddock is going back into a cropping phase. At this stage the remainder of the property is fenced to land class and cropped.

Key points

- Increasingly our rain seems to come 'out of season'
- The right perennials must make the most of our natural advantages and overcome the challenges
- Overgrazing is the quickest way to destroy perennials.

More and better lambs

We produce first-cross Border Lieicester/Merino lambs, our main business objective being to optimise both the number of lambs we can turn off and the quality of the product.

We have changed our lambing to June to match peak demand for feed (during early lactation) with peak feed supply. This has improved our lambing rate and survival numbers, and also takes advantage of the later and longer growing season of perennials so that we can finish the lambs in early summer.

Ironically, for the past two years we have had seen unusually early breaks to the season combined with extremely early finishes. Nonetheless, we are confident that we are heading in the right direction. Last year, for example, we had 50% more rainfall outside the growing season for annuals than within it. If climate change predictions are correct, we might see even more of this pattern.

Needless to say, the climatic conditions so far have been a real challenge. Our main pasture base is lucerne and perennial veldtgrass, although we are also trying



Photo: B Munday

Rex can relocate the temporary electric fence to the next cell in 30 minutes.

biserella, vetch, medics and saltbush. The drought has punished all of these.

As part of our property plan, we have set aside 50 m wide corridors for trees and shrubs – multi-purpose corridors to reduce the risk of wind erosion, provide shelter, and add to the aesthetic value of where we live and work.

Direct seeding of native vegetation has been really disappointing, particularly as it so quickly gets overrun with weeds. We have had more success planting seedlings, but this is extremely labour intensive.

We are now looking at an alternative approach to shelter belt establishment, underplanting a hedgerow of oldman saltbush down the centre of the crop. The harvester can pass over the saltbush in the first year. Sheep can then graze the stubble flag and spilled grain but will be removed before they attack the saltbush. We are hoping that this will overcome the need for fencing off shelter belts and reduce weed burden in the critical establishment years – two of the major problems when establishing native tree belts.”

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The science behind the story

By Scott Gillett

Rex has challenged many of the traditional paradigms that underpin farming in the Mallee. But he has done this with his eyes wide open, having actively participated in the *Mallee Sustainable Farming* project, Grain & Graze, and the activities of the Murray Mallee Local Action Planning group.

One of the first lessons you learn in the Mallee is that tough years are at least as familiar as good years. If perennials cannot survive the tough times they are no longer perennial!

Rex has identified lucerne and veldt as the species currently best suited to his grazing system, along with old man saltbush as both fodder and shelter. Research and other farmer experiences with perennials might, in due course, provide him with superior alternatives.

Lucerne is an excellent option, particularly in a cell grazing situation, because it is nutritious and enduring if well managed.

However the gaps between lucerne plants quickly become ‘open space’ for annual grasses, so it is important to fill that space with a complementary perennial. Research by the CRC Salinity in the upper south-east of SA showed veldt to be an undervalued species, as well as providing nutritional balance for grazing stock compared with lucerne alone.

Rex has experienced difficulty establishing good swards of veldt, not least because of the drought conditions. At the same time he is aware that the grass is naturalised on roadsides and amongst native vegetation where it is not grazed. Veldt is one of the few perennials that re-seeds, so it is important to allow pioneer stands to set seed before grazing. However, to maintain optimum grazing value, veldt needs to be grazed frequently enough to prevent it growing into large rank clumps. Grazing pressure can also be managed to maintain the right balance between lucerne and veldt.

Rex’s target of 2000 breeding ewes is well above the district average but by no means impossible. However, ambitious targets highlight the importance of research to bring forward the best adapted pasture species and cultivars, optimum establishment and management principles, and resilience in the event of drought or long term climate change.

With his background in engineering, Rex has an excellent understanding of design principles, monitoring and data interpretation. These will be important skills as he develops and refines his grazing enterprise. Like many farmers, he needs a couple of good seasons to move his experiment forward.

- Scott Gillett was formerly an Environmental Design and Management Consultant for Rural Solutions SA, now Project Officer (GIS) for the SA Murray Darling Resource Information Centre.

Gaining ground with subtropical grasses

Derek Blomfield has been concerned about the impact of annual grazing crops on his lighter country for many years. But things are turning around with the incorporation of subtropical perennial grasses into his farming system as he explained to Catriona Nicholls recently.

“Our property is basically made up of heavier black soils on the flats and lighter sandy loams and basalt soils on the higher sloping country.

Traditionally we have cropped the flats with cereals and fodder crops and had annual grazing crops on the slopes.

Because we can receive heavy rains during summer, when there is less groundcover, our lighter country is covered in contour drains to direct the flow of run-off and protect the soil from erosion.

While this system certainly directed water off the slopes, it was causing erosion and water quality issues when the water reached the heavier flats.

You could see water rushing off the slopes and it literally ran red with all the soil.

Even when we introduced direct drilling into our cropping system there was not enough groundcover during summer to prevent the loss of soil in heavy rain.

Case study: Derek Blomfield

Location: Caroona, New South Wales

Property size: 1000 ha

Mean annual rainfall: 600 mm

Soils: Light red soils on the higher slopes and heavy black soils on the flats

Enterprises: 280 cows 200 ha wheat, barley and sorghum



Photo: B White

Derek is thrilled with the results he is achieving with subtropical perennial grasses in terms of both improvements in livestock production and soil protection and health.

Key points

- Perennial pastures provide groundcover for year-round protection from storms and topsoil erosion
- Planned rotational grazing is essential for long-lasting perennial pastures
- Perennials greatly expand the growing season.

A paradigm shift

We knew there must be a better way to manage our resources, so became involved in the Holistic Management International™ program. This encouraged us to look at alternative options, including subtropical perennial grasses, which we have now introduced to our lighter country.

During January 2004 we sowed a mix of Katambora Rhodes, Premier digit and Console lovegrass. To be honest, the results looked patchy and by winter we just hoped they would start to fill in the gaps on the ground.

But during December 2004 we had 300 millimetres of rain and even with a sparse pasture cover, the water at the end of the contour drains ran clear.

This single factor impressed me so much that I'm now determined to have all of our run-off minimised and siltfree.

As part of our new approach, our focus is now on grazing for plant recovery to ensure we maximise our groundcover throughout the year, rather than growing a crop for six months and leaving the soil uncovered for the remainder.

Grazing management is critical to success with these grasses and overgrazing is the greatest risk.

Where we have overgrazed and the soil is bare, Paterson's curse has germinated, but when grazing is managed well, the subtropical perennials provide enough groundcover to prevent competition from it.

Interestingly we have found that excessive grazing pressure in autumn was revealed in the following spring in terms of increased weed pressure.

A productive mix

We hadn't expected great weight gains from our cattle on the subtropical pastures, but during August 2007 our prime cattle grazed oats and were gaining 1 kg/day while our cull heifers were gaining 1.7 kg/day on the dormant grasses with sub-clover in the base... a big surprise!

We now graze our weaners on the pasture during autumn and can still get winter feed off the residual pasture.

To try and improve the nitrogen content of the pasture we have included various legumes such as Seaton Park clover, bissurella, serradella, and Antaz sub-clover into the mix (with varying degrees of success).

In addition to the nitrogen, winter-active legumes help to ensure there is some feed on offer during winter when the grasses are dormant.

Establishment challenges

The most difficult thing to get used to is that sowing the pasture is a bit of a case of hit and miss.

When you sow wheat it either comes up or it doesn't, so you know fairly early on how successful you have been.



Photo: B White

Even in drought conditions the pasture has provided valuable feed and groundcover.

We direct drill the pasture with an old Connor Shea pasture planter, but it can take anywhere up to 12 months to know how successful the germination has actually been.

However, the pasture can self seed at anytime, so we ensure it sets seed at least once each year to maintain persistence.

We have continued the program across most of our lighter country.

To make the operation less expensive we have used the local weeds council harvester to collect seed for sowing.

Our recent pasture mix includes; 2 kg/ha Premier digit, 2-3 kg/ha Katambora Rhodes, 1 kg/ha Bambatsi Panic. We also include

some starter N/P/K fertiliser in the sowing mix.

“Certainly introducing sub-tropical grasses has been of great value. In conjunction with managing and improving our native grasses it is improving water quality and biodiversity above and below the soil.”

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The science behind the story

By Dr Suzanne Boschma

FFI CRC's *Agronomy of New Perennials – Tropical Grasses Project* is studying the key factors to successful establishment of subtropical grasses and the role of nitrogen on persistence, production and forage quality, and water use and rooting depth.

We don't have any control over the weather, but we can reduce the risk of poor establishment through sound weed control, using high-quality seed, and correct sowing time and depth.

Weeds need to be controlled for two years before sowing to reduce grass weed burdens. In an experiment near Manilla nil weed control resulted in 30,500 live seed grass seeds/m² while control for one and two years reduced seed numbers to 6200 and zero seeds/m² respectively.

Seed is expensive and quality varies so it is worth getting a copy of the purity and

germination test results or having a test done.

Correct sowing time and depth is essential. A study on a red soil at Tamworth showed optimal emergence when seed was sown 10 mm (up to 25 mm) below the surface from November to January.

Forage quality of subtropical grasses is commonly compared with temperate grasses and considered to be poor. However, it is important to remember that when subtropical grasses are growing, temperate grasses are generally dormant and low quality.

Subtropical grasses need to be compared with summer growing forages. We found the protein of Premier digit leaf during the growing season ranged 14–19% and the Metabolisable Energy (ME) 9.1–9.6 MJ/kg. That's equal to or better than the quality of forage sorghum, with the added advantage

of a longer growing season.

Incorporation of a legume or addition of nitrogen is important to increase forage production and quality, and animal production. Rainfall in the Tamworth region during the 2006–07 summer period was below average, however the addition of 100 kg N/ha increased forage production of Premier digit and Katambora Rhodes grass by up to 30% and 55% respectively.

- Dr Suzanne Boschma is a scientist working on the Agronomy of New Perennials — Tropical Grasses project

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Salt trial reaps rewards in Great Southern

For 25 years, Chris Walton has tried almost everything to control salinity. As he explained to Natalie Lee, he reached a critical point during the mid-1990s when, alarmed by the worsening problem, he spent \$100,000 in three years on salinity.

“I reckon about a third of it was wrong,” Chris said.

“We have to find better, more accurate solutions because its too expensive.”

Chris’s became involved in a five-year, on-farm Land, Water & Wool research trial aimed at boosting the sustainability and profitability of wool growers.

Chris is excited by trial results and claims for every dollar spent, a seven-fold return is achievable through timely intervention on salt-affected land.

An emerging issue

“The first signs of salinity emerged on our farm during the late 1970s, and a 600 hectare block on the valley floor is currently at risk of being severely salt-affected.

From the 1980s, we implemented salt management measures including deep drains, trees and saltland pastures, all of which have met with varying degrees of success.

During 2002, we became involved in the Land, Water & Wool trial carried out on two 26 ha sites in the affected area, with one site acting as a control.

The aim was to assess the impact of establishing a saltland grazing system on livestock, plants, and the water-salt balance.

Case study: Chris Walton

Location: Yealering, upper southern region, Western Australia

Property size: 3024 ha

Mean annual rainfall: 350 mm

Soils: Duplex soil types, grey cracking clay in the valley

Enterprises: Prime lambs, grain



Photo: Hayley Norman. Inset: Natalie Lee

Saltbush has boosted animal production on saline areas. INSET: Chris Walton on areas of bare salt scald at the control site

During 2003, earthworks were completed at both sites including deepening and widening two drains, and segregating the sites from outside water influences by constructing grader banks. Monitoring bores, flumes to measure water flow from the sites and weather stations were installed.

During 2004, we sprayed the site twice with a knockdown before seeding. Using a combine and a seeding rate of 8 kg/ha, pastures including Santiago medic, Caliph medic, Nungarin subclover, Frontier balansa clover, Prolific persian clover and Prima gland clover were sown during mid-July.

We planted Old Man and River saltbush in rows during late July at a rate of 670 plants per hectare using a one-pass Chatfield planter.

Superphosphate was applied at sowing, and the site was sprayed for lucerne flea later in the season.

We lightly grazed the site during 2004 and 2005 and measurements were taken from

January 2006, when 350 Merino weaners were grazed across both sites for 1200 days grazing days equivalent.

The trials revealed that a profit of \$60 to \$100 per hectare was achievable across the grazing trial site, compared with zero profit from the control site.

There has been phenomenal dry matter growth — about 8 t/ha during 2005 — largely because of the understorey.

Additional profits could also be achieved by farmers using their productive land more effectively.

I now better use my productive country knowing I have this feed source available on my salt-affected land.

The trial has also resulted in increased water usage at the grazing site, compared with the control site, where salinity was still spreading.

On the trial site, there is colonisation by medics and pasture on the more salt-affected areas — some of which are quite bare.

Key points

- Saltland grazing systems can increase productivity and profitability from salt-affected areas of land
- Increased water use from saltland pastures can reduce the spread of salinity.

Lessons learned

We found it better to plant higher numbers of saltbush on a given area, and triple rows of saltbush were better than double rows.

In future, we would use wider spacings, about 15 metres between the saltbush rows, to allow easier machinery access.

I think better saltbush, pasture and grass varieties are needed for saline land, and correct establishment is critical, particularly on heavy soils. It is not country you can easily get back on to.

Apart from making farms more productive, establishing saltland pastures have benefits

for the broader environment by keeping waterways fresh.

From an environmental point of view, it's a win-win situation — the water is being trapped by the saltbush and pastures, and it's not going into streams."

- *Land, Water & Wool was a joint investment by wool growers through Australian Wool Innovation Limited and Land and Water Australia, with support also coming from Meat & Livestock Australia, Australia's National Dryland Salinity Program, CSIRO, the WA Department of Agriculture and Food, and FFI CRC. For further information, visit www.landwaterwool.gov.au.*

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Tell your story in SALT...

Future Farm Industries CRC is developing new and adaptable farming systems for Australia by creating new land-use practices which will make agriculture more productive, diverse, adaptable to climate variability and sustainable. The use of perennial plants is a primary focus of the CRC's research because of their adaptability to climate variation and ability to lower water tables in low-lying, saline areas.

Do you have a story to tell about your experiences in new farming practices, or using perennial plants? If so, *SALT Magazine* wants to help spread the news. Contact the Communications Manager or your nearest state FFI CRC Node Manager:

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The science behind the story

By Dr Hayley Norman

When this project was started during 2001 it was unclear if saltbush-based pasture systems produced enough feed of sufficient quality to justify costs of establishment. There also was little information concerning water use by halophytic shrubs in saline soils and the ecological value of saline land. The challenge was to construct pasture systems that allowed producers to profitably utilise saline land while improving the health of the environment.

Overall, the revegetation of saline land in the low to medium rainfall zone of south-western Australia offers benefits to producers in the form of economic returns from animal production systems and environmental health. Our data quantifies the feeding value of saltbush-based pastures and the environmental impact of saline grazing systems on salt and water movement and biodiversity at paddock scales. Through whole-farm economic modelling we have estimated the returns from these systems to producers.

At Chris's site we have demonstrated that revegetation with saltbush and annual legumes supported 2.8 to 4.6 times more sheep during the autumn feed gap than unimproved saltland. Saltbush-based pastures had their greatest relative value after a poor growing season. This equates to 500-1200 autumn grazing days per hectare of salt-affected land and 2-5 kg/ha of clean wool.

This study found some evidence that saltbushes use more water than unimproved saltland. The saltbushes at Yealering have enhanced evapotranspiration within plots and the soil under the saltbush at Yealering appears to be showing an increased drying period, and a decline in shallow water table.

The economic return from improving a saline site will be largely dependant on the level of understorey biomass which can be grown. At a similar research site in Tammin, where the soil was too salty for burr medics, saltbush and volunteer understorey is not profitable.

While each of the individual benefits were not overly large, however when combined, there is a positive case for producers in the low to medium rainfall zone of WA to invest in revegetation of saline land with saltbush-based pasture systems. The data indicates that the greater the degree of salinisation, the smaller the benefits.

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salt

SALT — The Magazine of the Future Farm Industries CRC

"We work on the principle that the best way to beat these weeds is to crowd them out with a thick pasture."

Wes Seeliger, farmer, SA (see story, page 4)

"We thought we should be able to direct drill a crop into it ...it was far more successful than we expected"

Colin Seis, farmer, NSW (see story page 6)

"Perennials are providing a good substorey and additional feed to the saltbush."

Gary Butcher, WA (see story, page 8)

SALT Magazine brings you success stories from people adopting farming systems based on perennial plants that are making their farms, local landscapes and catchments more profitable and sustainable. Dryland salinity, climatic variability and other natural resource constraints threaten the long-term viability of regional areas. However, backed by innovation and good science, farmers are successfully managing these constraints and often turning them to advantage.

FFI CRC was formed in July 2007 to build on the former Cooperative Research Centre for Plant-based Management of Dryland Salinity's work in making dryland agriculture in southern Australia more adaptable through innovative research, education and training, and commercialisation. The CRC promotes innovation in dryland farming appropriate to Australia's unique environment, and which will prosper in the long term. For further information about FFI CRC visit www.futurefarmcrc.com.au

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