



# future farm

PERSONAL STORIES FROM AUSTRALIAN FARMERS

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## Matchmaking made easy

Producers pick from a plethora of perennials to meet the challenges of a varied landscape

# Resilient systems provide flexibility

A lot has happened in the 12 months since I wrote the foreword for the December 2008 edition of *Future Farm*. Back then, the storm clouds had gathered with politicians and experts warning us to hold on because the Australian economy was in for a bumpy ride. As we know now, the Global Financial Crisis did not hit Australia as hard as predicted.

Australian farmers did not fare so well. After enjoying high wheat prices in 2008, there was a steep decline in wheat prices during 2009. At the same time the value of the Australian dollar soared to put real pressure on farmers' terms of trade. Many parts of Australia continued to experience difficult conditions will some areas still declared drought affected.

Over the last few years, sheep numbers have been on a steady decline resulting in Australia having the smallest national flock in more than one hundred years – potentially limiting

farmers' options for managing the now obvious variability and risk they face.

In this edition, we examine what has caused this alarming decline in the national flock and discuss its significance to Australian broadacre farming and what can be done about it. In the face of these business risks farmers tell their own stories about what they have done to adopt new ways to diversify their mixed enterprises and gain a greater economic resilience by being more flexible to market forces.

Through the development of new perennial-based technologies and systems, the Future Farm Industries CRC has a key role in achieving this goal by helping farmers respond creatively to short term and long term market trends. The incorporation of perennials into farm enterprises also provides other economic and environmental dividends that in the long term reduce costs while creating new opportunities.

A good way to find out what perennial plants can do for your business is to read the stories that lie ahead in this edition of *Future Farm* magazine. These stories show the variety of ways that perennials can be added to farming systems throughout southern Australia and the many benefits they bring. Their willingness to give things a go and try something different has rewarded these farmers with more stability and certainty in a time of change both environmentally and economically – stories that I hope will inspire change. With that in mind, I encourage you to turn the page and read on.

**Kevin Goss**

*FFI CRC Chief Executive Officer*



Read about the successes producers across varied landscapes are achieving with perennial pastures and shrubs inside this issue of *Future Farm*.

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## OUR COVER

Lyn and David Mathwin have discovered the value of matching the right plant with the right place in their farming system.

- See full story page 6.

Photo: Josh Guimelli, Kondinin Group





# National flock – the future hangs in the balance

**T**he size of the national sheep flock is dwindling as many producers make the switch from wool to cropping and meat production, and the debate is on as to what the future holds for the sheep industry as a whole.

The national flock – currently estimated at 71.6 million – is lower than it has been for more than 100 years.

Industry experts agree on the reasons causing the decline, but not all agree on the way forward.

The Future Farm Industries CRC Board recently convened to hear what the experts had to say on this pressing matter and considered the various views in order to determine the best future research direction.

## Determining factors

During the past 20 years sheep numbers have steadily declined as prices plummeted during the offloading of the wool stockpile. This shift away from sheep has been exacerbated by high returns for other commodities, such as grain.

The final straw has been widespread drought – growers have not wanted to pay high feedgrain prices to feed sheep that bring low returns.

## key points

- Sheep numbers on a national scale are plummeting and increased productivity rates and reduced turn-off are needed to stabilise the flock
- Strong commodity prices for grains, meat and live sheep exports have exacerbated the decline in sheep numbers
- A longer-term focus will remind producers that pasture and livestock remain key drivers of whole-farm profitability.

## Shift in focus

One shining light for stalwart producers has been the increasing prices for lamb and live sheep exports. While this has bolstered returns for remaining sheep producers it is putting further pressure on flock numbers as marking percentages are not keeping pace with turn-off (see Table 1).

A number of strategies are possible to arrest the decline, including lifting reproduction rates (marking percentages), retraining ewes longer (including cross-breeds), and reducing turn-off.

It is here that the debate heats up.

Meat and Livestock Australian predictions suggest the outlook for lamb and sheep meat will continue and the into cropping is already slowing.

Internal research by Landmark reveals that producer confidence towards sheep, regardless of the final commodity, still lags behind that of grain production. And while grain producers are currently keen to invest in new technologies to improve and expand their cropping businesses, sheep producers may not be quite so motivated to do so.

This could impact on the levels of adoption of new technologies aimed at boosting marking percentages.

Benchmarking data from private farm business consultants, Holmes Sackett supports the Landmark findings. They have observed that the intensification of sheep production is not occurring at a rate fast enough to compensate for producers making the shift to cropping.

## Long-term focus

All the doom and gloom could be a tad reactive according to Future Farm Industries CRC Research Director Dr Mike Ewing.

Dr Ewing believes the recent significant shift to grain production is logical but possibly shortsighted. He suggests a longer-term focus is required.

As Dr Ewing points out, in contrast to the outlook this time last year, the current outlook for cereals is substantially depressed – the outlook for sheep is substantially better.

TABLE 1. Sheep balance sheet – 2008-09

Opening number of sheep	76.9 million
Per cent ewes	61%
Per cent ewes joined	80%
Marking percentage	85%
Lambs marked	32.0 million
Lambs slaughtered	20.8 million
Sheep slaughtered	11.3 million
Live exports	4.2 million
<b>Total turn-off</b>	<b>36.3 million</b>
Deaths on farm (1.4%)	1.1 million
<b>Closing number of sheep</b>	<b>71.6 million</b>
Source: Kimbal Curtis (DAFWA)	

He adds that forward-looking producers traditionally use the balance between livestock and cropping to minimise long-term financial risks and predicts there will be a natural adjustment back to livestock during the coming 12 months.

This strategy is supported by insights from whole-farm economic analyses developed through MIDAS modelling.

## Research impacts

A mixed enterprise emphasis is fundamental to the work of the Future Farm Industries CRC. The CRC aims to have profitable options for farmers to invest in when market and climate conditions allow, but in turn, producers need to remember their key strength lies in their flexibility.

Mike reminds producers that perennial pastures and livestock, particularly meat production, remain key drivers of whole-farm profitability over the long term. 🌱

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# Subtropicals set pace for rapid transformation

Subtropical pastures have transformed the landscape on Marty and Karen Brennan’s mixed farming property in northern NSW and Marty shares his enthusiasm about his productive perennials with Catriona Nicholls.

“We run a mixed farming enterprise where we crop on our most productive ground and have traditionally run sheep on the poorer country,” Marty said.

“Our pastures were a mix of lucerne and native grasses, but with increased dry seasons the lucerne just wasn’t coping. When the leaves fell to the ground, the soil was exposed to the heat during the dry summers.

Our native grasses just weren’t giving us any bulk feed and any carryover feed they had tended to be worthless without rain.

So we were looking for something that would boost our livestock production and give us better groundcover to prevent our soils from washing away during heavy storms.

Other local producers were having great success with subtropicals, so we thought it was worth giving them a go.

## Getting started

After much procrastination we started off after the local Namoi Catchment Management Authority got some funding and we were away.

We sowed Katambora Rhodes, Bambatsi panic, ‘consol’ lovegrass and premier digit as a bare seed mix at 4 kilograms per hectare with 70 kg DAP fertiliser.

## key points

- Subtropical pastures have transformed country that previously struggled to be productive
- Stocking rates have increased, run-off has reduced and soil structure has improved under the subtropical perennials
- Success with subtropicals relies on a change of mindset from set stocking to rotational grazing.

## farm info.

**Case study:** Marty and Karen Brennan

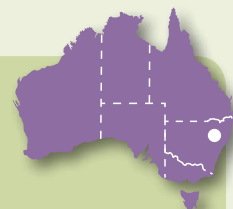
**Location:** Boggabri, New South Wales

**Property size:** 1600 ha

**Mean annual rainfall:** 600 mm

**Soils:** Alluvial flats to heavier chocolate country and red gravel ridges

**Enterprises:** Sheep, cattle and cropping



Photos: Lester Thearle

*Marty and Karen Brennan have been overwhelmed at how the subtropical grasses have revitalised land they previously considered to be their least productive paddocks.*

We were a bit late sowing as we were still using conventional machinery and undertook a few preparatory cultivations to get the weeds under control first.

But after getting the pasture in between Christmas and the New Year, we were grazing it by February with sheep and cattle.

We were absolutely gobsmacked with what the paddock did – we started with our worst country and it just transformed it into some of our best feed in no time.

## Spreading the benefits

Our next step was to sort out a bit of plan with how to bring the rest of the farm into subtropicals, while still coping our better country.

We’ve now got about 445 ha of subtropicals established and we’re working hard to match feed with stocking rates and water.

It’s bit hard to quantify, but we’ve certainly increased stocking rates with of the subtropicals.

We’ve also had to reduce the size of the paddocks to make the best use of the feed.

We had to install a reticulation system for stock water as their is no longer any run-off on the paddocks – it’s not a bad problem to have.

And we’ve seen a transformation in the soil – it now takes in the water easily, the organic matter created from the bulk of the feed is making an environment that allows the nutrient cycle to really get going.

**Weed Risk Note:** Future Farm Industries CRC advises farmers to be wary of not confusing ‘consol’ lovegrass with African lovegrass, which is a declared noxious weed in Australia.



The country you couldn't drive a crowbar into before you can almost just push a shovel in now.

I'm amazed at how quickly the country has responded and what it can actually do – we've never seen it grow so much feed.

### Facing the challenges

Probably the biggest challenge we still face is a dry autumn. If you don't get a break and some clovers happening you can have a bit of a quality feed gap during late autumn.

We usually have a good carryover of feed after the subtropicals dry off. But without an autumn there is a bit of a gap where the feed isn't quite as valuable. But you've got to weigh that up with the rest of the year.

Paddock size or mob size is important just so you can move stock in to eat the bulk down and move them on – it's a totally different scenario to the old set stocking regime.

It's a matter of getting your head around set stocking as it takes a bit of getting used to.

There's still heaps of feed in the paddock but you're moving the stock out of it.

Before we made the move to subtropicals, we'd done a lot of investigation through field days and talking to lots of people – somewhere along the line you realise you've just got to make the change.

People often shy away because of the costs and risks involved with establishing subtropical pastures.

But we look at it in two different ways – we've grown wheat crops before that have failed and we've gone back in the next year. It's the same with subtropicals.

Secondly, if you get a successful establishment it's cheap – the pasture will be there for a long time. People still go back in and grow oats year in year out and don't question the cost of doing that.

In terms of additional inputs, we do fertilise the subtropicals when the cash is available.

If you've got the whole-farm plan right, where your paddock size is right and your

water is right, you'll get the most value out of the fertiliser you put on.

The subtropicals are a real success story for our mixed farming system. In a dry season like this, where we have only had 254 mm of rain for the year, 63 mm during the growing season – our crops have suffered. But we've had a bit of rain during harvest and the grasses have jumped away to a great start.

We've still got a way to go with our livestock system, but the subtropicals are helping us with our move from trade cattle to a breeding operation and have transformed our pasture country along the way.”

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### By Lester Thearle, Namoi CMA

- **The practice of sowing subtropical perennial grass pastures in north-west NSW has been about for several decades but their widespread use has been fairly restricted.**

This is changing with more and more farmers, such as Marty and Karen Brennan, realising the potential of these pastures and successfully establishing them to great advantage.

The big increase in the use of subtropical grass pastures is in response to growing concerns by many farmers about several factors. These include the cost of and reliance on fodder crops, the lack of productivity and groundcover of annual pastures, the lack of productivity of many poor native pastures, the low or negative returns from marginal cropping country and the lack of groundcover and short productive life of lucerne pasture.

Subtropical grasses can provide growth for up to nine months of the year. At times they can provide in the order of 13 tonnes per hectare of highly nutritious feed and can persist for many, many years – even decades.

On top of this production, their vigorous and extensive fibrous root system can reach several metres into the soil profile, adding enormous benefits to soil structure, carbon sequestration, water use efficiency, nutrient cycling, soil biology and general soil health.

The keys to successful use of subtropical pastures lie in their establishment and follow-up management.

At sowing, weed competition is the major killer and clean country is a must. To achieve this country it is best cropped for at least two years before sowing. Sow early in the season for maximum probability of germinating rainfall (mid October to early November is ideal). Use good quality seed with a high germination percentage and sow at shallow depth (consol lovegrass is best sown on the surface, all other species at 6 mm depth).

Sowing suitable species also is important and the species Marty and Karen have used have proven to be the best combination for establishment, durability and grazing value for their area.

Without follow-up management, these pastures will not last. Rotational grazing,

with significant rest periods, taking only about one third of the feed on offer at any one time will provide vigorous, long-term stands. They love nitrogen – so legumes and topdressing each spring with at least 200kg/ha of sulphate of ammonia or equivalent in urea will achieve outstanding results.

I know of no better way to achieve what Marty and Karen have achieved in boosting their grazing productivity and improving the soil, than with their use of subtropical grasses.

- **Lester Thearle is a Production Systems Officer with Namoi CMA. He is involved with grazing projects funded by Namoi CMA aimed at improving the productivity and sustainability of perennial grass based livestock systems.**

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# Taking a punt on perennials

With a view to filling their autumn feed gap and preventing erosion from summer thunderstorms, Lyn and David Mathwin turned to perennials almost 10 years ago and as they explained to Josh Giumelli, one of the biggest hurdles to overcome was a lack of information.

“When we started, nobody knew anything about perennial pastures,” Lyn commented. “We just had to try and carry out the research ourselves.

Initially we sowed tall wheatgrass, fescue and cocksfoot – those were the only real varieties available so we just went with them. It was a bit of trial and error.”

“Different species are suited to different areas of the farm. These days, we just throw in a blanket mix and what grows, grows.”

David said a mixture of species has been the key to growing perennials on their farm; “We use a ‘shotgun’ mix. With lucerne, it will grow in some spots, except where it’s too wet – it doesn’t like getting wet feet for too long. We don’t plant for 100 per cent coverage, but let the dominant species take over.”

With sowing rates of a perennial mix ranging 7-10kg/ha, and seed costing \$7-12/kg, it can add up pretty quickly. I think it is one of the reasons why more people don’t invest in perennials.

Apart from our lucerne and tall wheatgrass, we now go with chicory and plaitain, as well as a saltbush plantation.”

## Resting is the key

“One of the biggest keys to successful perennials is resting them,” Lyn said.

## key points

- Different species suit different areas across a single farm
- Resting pastures from grazing will ensure regeneration and seedling recruitment
- Year-round groundcover from perennials helps build soil humus levels
- Perennial pasture establishment is expensive, but the benefits are bountiful.

## farm info.

**Case study:** Lyn and David Mathwin

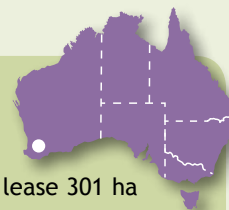
**Location:** Kojonup, Western Australia

**Property size:** 880 ha, plus share-farm 689 ha, and lease 301 ha

**Mean annual rainfall:** 475 mm

**Soils:** Marri duplex soil, some gravel, pH 4.8 to 5.0

**Enterprises:** Cropping, beef, sheep (meat and wool)



Photos: Josh Giumelli

Groundcover is of utmost importance for retaining soil moisture, reducing erosion, and improving soil humus. INSET: Lyn and David Mathwin.

“Its very, very important. If you want perennials in the landscape, you have to manage for a perennial cycle.

If you manage them like annuals, you’ll kill them. Lots of rest is needed for better production, and ours are so much better since we worked that out.”

“Even so, the tall wheatgrass is tough, and it will take a real hammering,” David said.

“But you’ll end up killing the other species, such as fescue and cocksfoot if you graze them too hard.”

“We want to get our perennial operation to the point where it will regenerate itself in the pasture,” Lyn said.

“We’re not quite there yet but we’re working on it. If we can get recruitment then we’ll be right.

## Keeping soils healthy

We’ve worked hard to improve soil health, and have done a fair amount of soil testing in the past.

We use Western Minerals fertilisers and chicken manure, and have used a microbe seed dressing to inoculate more bugs back into the soil.”

“We applied lime a few years ago to improve soil pH and raise calcium levels, but probably over-applied it a little at rates of 2-2.5 tonnes per hectare,” David said.

“We now apply much lower rates of lime (0.5-1 t/ha) – that way you don’t upset the soil balance.”

“You also need to keep the soil covered, especially during autumn and hot summers so the bugs will survive,” Lyn explained.

“That’s where the perennials come in. They also help build the soil humus levels.

If you’ve got the bugs right and the soil cover right, the pH will soon fix itself.

## Branching out with saltbush

“We planted saltbush with the aim boosting productivity on what was totally unproductive country,” Lyn said.

**Weed Risk Note:** Future Farm Industries CRC advises farmers that tall wheatgrass has a very high environmental weed risk in Victoria.



"It is in its third year now, and was put in with a grant from the Warren perennial project for water and rivers.

It's planted on a salty river flat and doing well, even though at the time the experts were a little divided as to whether it would be a success.

We generally pulse graze the saltbush twice each year for about six weeks prior to lambing in autumn and again during spring, giving the rest of the paddocks a break.

But this year, because it was a late start, to winter we only got the autumn graze.

We are aware of the need to manage the grazing carefully, as we know someone who grazed their's too soon and too hard, and because it was so wet and cold during July it died. But in a good season we'll safely graze twice.

We've put drainage in, and now we're getting regeneration in between the saltbush as the waterlogging has been reduced.

### Reaping the rewards

It's hard to quantify the benefits, but we're definitely ahead with perennials.



Lyn inspects a paddock sown with cocksfoot and fescue.

Our stocking rates have stayed largely the same, but we're making more money than if we'd stuck with the old system.

As an added benefit, the whole farm is a lot healthier for it. Establishing the perennials is expensive, but overall we're still better off.

We've reduced our supplementary feed requirements during summer, and summer rains don't cause the erosion problems they have during the past."

### Looking to the future

"We plan to incorporate more shrubs into the system, such as saltbush and fodder shrubs," Lyn said.

"We'd also like to sow more summer actives as well, but haven't really played around with them too much yet."

"We started off sowing our pastures with an old combine," David said. "These days we use knife points."

"Another future direction for us is pasture cropping and we may look at a disc machine for sowing both our crops and perennial pastures, although they are pretty expensive.

Discs would be great for sowing crops straight into pasture, as the tines can tend to rip out the big perennial clumps if the soil is loose.

There's still so much to learn as its a huge field, even though we've been doing it for 10 years now – luckily now there is a lot more advice available these days." ↘

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By Paul Omedei, AgVivo

## science behind the story

- When it comes to perennials, David and Lyn Mathwin epitomise what producers are required to do to make them a success. Planning, small farm trials, seeking information and preparedness to change are just a few of the points that come to mind.

The Mathwins have had a strong focus on right plant, right place and this has underpinned their success with perennial persistence. The practice of 'shotgun mixes' has proved very successful as different species perform better (or worse) in different soil types. Over time, the change in species persistence and survival of the fittest will become evident, so the 'right' mix does eventually occur on the different soil types. Producers can fence as best they can to soil type, but in this region of WA, there can still be variation within 10 metres – it

is difficult to fence exactly to soil type. Rather, the Mathwins have fenced to land management units, which provides greater control over their perennial areas.

A grazing management plan is what is required for perennials and the Mathwin's have certainly grasped this concept well. Perennials simply need a rest after grazing, some more than others, such as saltbush, and to do this is a key skill a producer requires. If perennial pastures can not be rested in a livestock system then don't grow them – it's as simple as that.

The Mathwin's new saltbush area has shown what can happen when a key focus on grazing management is maintained. It is a great example of letting nature take its course. We now see many other species within the saltbush rows coming back into the mix. Firstly, barley grass, some patches of clover and even ryegrass. Even though barley grass is not a preferred

species of choice for sheep grazing, it is better than bare patches of nothing.

The Mathwins will trial other species within these rows, such as tall wheatgrass, chicory and plantain. With the long grazing rest or 'pulse' grazing strategy used in the saltbush area, species like this will have a chance to set seed and the inter-rows will improve in density with time. Perhaps not too long into the future we'll see the salt scalds completely disappear. This would truly be a success.

- Paul is a farm consultant with AgVivo.

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# Saltbush proves valuable ‘living haystack’

**E**stablishing old man saltbush on unproductive areas has helped Peter Kroehn, Waikerie, South Australia, significantly increase stocking rates and reduce sandhill erosion. He recently shared some of his experiences with Kylie Nicholls.

“I have always been interested in growing perennial plants but we can’t grow lucerne due to insufficient rainfall, so one of the few options available was old man saltbush.

Planting saltbush on our marginal country fits in well with our cropping enterprises. I like running sheep and want to maintain our livestock enterprise, but to do that we need to have a ‘living haystack’ of perennial plants. At this stage saltbush is very valuable – it does well on our country and grows prolifically if managed correctly.

Our average stocking rate is about 0.5 sheep/3 ha but saltbush allows us to increase this to 3.5 sheep/3 ha. This is a significant improvement considering it only cost us about \$370/ha to establish.

## Early planting days

We started planting saltbush during 1995 after seeing a patch planted on a neighbouring farm.

In the early days we sat down and carried out some property planning to map where best to plant. We used an aerial photograph and our own knowledge of the different soil types and topography while taking into account fence locations and distance of waters.

We started by planting 28 ha on some of our better country that we could have kept cropping. The location was selected due to its close proximity to the sheepyards and water.

We now have about 162 ha of saltbush and the remainder has been established in hard

## key points

- Establishing areas of saltbush on marginal land can provide a productive fodder base to sustain increased stocking rates
- Ensure the saltbush is grazed for no more than six weeks during autumn
- Supplementary feeding of grain or hay is crucial to provide a balanced diet.

## farm info.

**Case study:** Peter Kroehn

**Location:** Waikerie, South Australia

**Property size:** 4500 ha

**Mean annual rainfall:** 235 mm

**Soils:** Sand to sandy loam over stone

**Enterprises:** Cereal cropping, self-replacing Merino flock, prime lambs



rocky areas where little else will grow. Saltbush was also planted along sandhills, which have previously blown, to stabilise the ground and reduce erosion.

Most of the saltbush areas vary from about 6-12 ha with many based at the end of paddocks where the rocky ground is located – it was pretty simple to fence off.

The entire property is on reticulated water from the Murray River so we extended water pipes and troughs to ensure water access for sheep grazing the saltbush.

We bought a saltbush planter developed by Western Nursery at Waikerie, which I like to describe as a bullet-proof veggie planter. With it we can plant between 10,000-15,000 plants per day.

The saltbush planter has a scrape on the front, which pushes away the weed seeds and grass to reduce competition. It then rips a line in the soil down the centre and every 1.6 m a plant pops into the ground.

We apply a slow-release fertiliser at planting and although it is recommended to water them in, we don’t bother as generally we aim to plant during winter when there is some sub-soil moisture available – the boggiest the ground is the better.

Initially, I trialled planting rates from about 1200-1700 plants/ha. But I think a rate of about 1200/ha is best. Planting at the higher rate seems to cause too much die-out due to added competition.



Planting saltbush on marginal areas of his Waikerie farm has allowed Peter Kroehn to increase stocking rates and help reduce sandhill erosion.

The only other equipment we need to maintain the saltbush after planting is a brushcutter, which we use to trim the plants during September, allowing them sufficient time to grow before being grazed.

## Intensive autumn graze

The sheep graze the saltbush for a five-to-six-week period during autumn, after the stubbles have been depleted.

We could probably graze it twice a year and we have trialled this. However, we believe one annual 5-6 week feed is more beneficial and extends the production of the saltbush.



It is a living haystack of annual feed and we know we can come back with 1000 extra sheep, run them in the saltbush and maintain our stocking rates.

I use visual indicators to assess when the saltbush is ready to be rested. Generally, when you drive through the saltbush paddock and you can easily see the sheep, it is time to remove them, but it must be within a six-week period.

One important thing I have learnt is you must provide sheep with supplementary feed while they are grazing saltbush – it contains a lot of salt and oxalates.

If we have 6 ha of saltbush grazing 100-150 sheep on it we generally feed out about two round bales of oaten hay per week as a supplement. We also supplementary feed oats.

### Lamb protection

We often lamb down in the saltbush to reduce mismothering. It is so sheltered and quiet and because it is also contained in a small

area ewes are quite happy to wander off for a feed and leave the lambs behind, easily finding them again.

I would estimate that lambing down in the saltbush significantly increases our average lambing percentages by as much as 10-15 per cent. The average lambing rate is 90%.

The saltbush has proven to be a valuable addition to our farm, stabilising the sandhills, increasing stocking rates and also has the added benefit of providing important shelter to lambing ewes.

Our sheep enterprise works well with our cropping enterprise and although it has a smaller economic value, I do not want to go down the path that many other croppers have and not run any sheep. I like them and think that in our area it is important to have some diversity on your farm.

### Perennial options

I have become involved in the *EverCrop*® project and the Local Adaptation Group,

which are looking at the role of perennials in mixed farming systems in the Mallee.

We have about 400 ha of open plains country, which has a mix of native grasses, shrubs such as *Eremophilas* and *Myoporums* and wildflowers on it. Over the years, we have let the country deteriorate and have had to change our management to survive. But I would like to help the country recover.

I hope the *EverCrop* project can show the role perennial plants can play in the Mallee and that the *Enrich*™ trial will offer some other perennial plant options for us. 🌱

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By Dr Rick Llewellyn, CSIRO

- Many farmers are looking for a more resilient crop-livestock system that allows for a flexible cropping program while maintaining a substantial livestock enterprise. This balancing act needs a reliable fodder base and this is where *EverCrop*® research fits in.

The Future Farm Industries CRC's *EverCrop* project aims to develop a profitable role for perennials in mixed farming systems. In the low-rainfall Mallee of SA and Victoria, the project is looking at where perennials, such as fodder shrubs can be most profitable. This requires a whole-farm approach. *EverCrop* has established a Local Adaptation Group of 10 farmers near Waikerie, including Peter, who are helping guide the research being conducted with CSIRO and DPI Victoria.

Saltbush has been one of the main perennial fodder plants grown across the Mallee but most farmers have only planted small areas, often to rehabilitate saline or eroded land. The trade-off with potential crop production is an important consideration. As such, saltbush often is planted on land deemed too marginal

for intensive cropping – in Peter's district this is often stony land.

The productivity and water-use pattern of fodder shrubs across a range of Mallee soil types and seasons is the subject of field experiments and modelling led by Dr. Anthony Whitbread (CSIRO). We aim to identify where and how these fodder shrubs might prove most profitable under current and future climate scenarios.

Peter has one of the larger areas of saltbush planted for fodder in the region. But there are many reasons why other farmers do not plant large areas to fodder shrubs. Constraints include high establishment costs, relatively low annual dry matter production of existing species, feed quality and in some cases, concerns about longevity.

Most valuable is the ability of the shrubs to provide fodder at critical times, such as autumn and drought. But increasingly it is recognised that what grows between the rows is as important to the productivity and profitability of fodder blocks.

There is a local shift towards concentrating cropping inputs on the most responsive soil types and at the same time maintaining business diversity by running a low-cost livestock system. As such, there is a growing level of interest in how to gain

greater grazing value from marginal soils. As well as looking at some potential grass options, *EverCrop* has partnered with the *Enrich* project and has established a field site where 15 alternative perennial shrub species are being tested for establishment and fodder production. The site includes a diverse range of *Atriplex* and *Rhagodia* species and other native plants such as *Eremophila*.

By integrating field research and modelling plant performance across soil types and seasons, farmer experience and whole-farm bio-economic analysis, *EverCrop* in the Mallee is evaluating options and building the capacity to look ahead to the best mix of plant options to serve future mixed farming systems.

- *Dr Rick Llewellyn is a Farming Systems Scientist with CSIRO and co-leader of the national EverCrop project. In the Mallee, research partners include CSIRO, Vic DPI and SARDI in collaboration with Rural Solutions SA, Murray Darling Basin NRM, Mallee Sustainable Farming and BCG.*

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# Long-term focus brings peaceful co-existence

**D**uring 2003 Bruce Maynard and his innovative farming system featured in the former CRC Salinity *SALT Magazine*. Fleur Muller recently caught up with Bruce to see what he was up to these days.

“We’ve changed many things during the past six years but continue to implement strategies appropriate for long-term landscape regeneration,” Bruce said.

“Our major achievement is that we can demonstrate how grazing, cropping and biodiversity can co-exist in the same areas at the same time.

Our philosophy of maintaining and regenerating natural functions, while still generating a profit in ways that enhance enjoyment for the family has remained fairly constant for the past 20 years.

We take a triple bottom line approach and aim to mimic natural processes to maximise outputs, while minimising inputs. This is done by using a combination of techniques including cell grazing, holistic management, no-kill cropping, regeneration areas, trees for carbon credits, alley farming, shrub plantings and stress-free stockmanship.

All these methods are implemented with a long-term context – in fact we take a 100-year view on sustainability.

## Perennial focus

Perennial-based grasslands are the backbone of our farming program and we don’t think of them as simply pastures; we view our farming system in terms of integrated grassland, shrubland, woodland complexes (which we work with to gain the maximum amount of natural cycling) and biodiversity functioning.

## key points

- Perennial grasses and shrubs provide the backbone of a low input farming system
- Cattle and sheep can help regenerate native perennial species and generate profit
- Planting saltbush on the contour or slight curve reduces wind flow and creates more diverse micro-habitats for the same cost as planting in straight rows or blocks.

## farm info.

**Case study:** Bruce Maynard

**Location:** Narromine, New South Wales

**Property size:** 1476 ha

**Mean annual rainfall:** 520 mm (evaporation 1980 mm)

**Soils:** Hard-setting red clay loams, sandy clay loams and grey cracking clays

**Enterprises:** Beef cattle, sheep breeding and mixed cropping



Photos: Bruce Maynard

*Bruce Maynard has implemented a whole farming system approach based on perennial shrubs and pastures that delivers a balance between profitability, farming and lifestyle.*

Pastures regenerate naturally and consist of a complex mix of mostly native summer-active and winter-active grasses. They include wallaby grass, lovegrass and curly windmill grass together with some naturalised clovers, medics and forbs. We have counted up to 80 different species in some paddocks and we don’t rely on introduced species such as lucerne any more.

Paddocks are increasingly complex grasslands with trees regenerating of their own accord. The place is moving back towards open woodland – like it would have been in its natural state.

### Livestock fit

Cattle and sheep are a tool we use to regenerate the landscape, encourage more native perennial species back into the system and deliver an income.

During the past four years we have started breeding and trading sheep again. We now

run around 2000 damara and dorper cross lambs and ewes.

It was always our plan to reintroduce no-shear sheep, which suit our lifestyle and economic goals, but we just wanted to wait until these shedding breeds were more widely accepted by industry.

We also grow, finish and background cattle, but we do not breed anymore.

Averaging 120 kilograms on entry, cattle are turned off at around 350kg. Importantly, we run a beef profit rather than a beef production system. We focus on returns to capital and turnover period goals instead of beef production targets. This allows us to manage our stocking program to optimise natural function and sustainability while still generating economic returns.

### Grazing tools

Our cell grazing approach is based on elements of holistic grazing and fodder

**Weed Risk Note:** Future Farm Industries CRC advises farmers to be wary of not confusing agronomic varieties of lovegrass with African lovegrass, which is a declared noxious weed in much of Australia.



budgeting and time control grazing methods and we strive to constantly enhance the diversity and biomass of our grasslands.

Paddocks are grazed intensively for short periods and then given adequate time to recover, which is mainly determined by plant growth rates. Rest period, recovery, utilisation, spatial grazing variation, growth stage and seasonal timing determine stock movement around the farms 120 paddocks.

On average, paddocks are grazed three times a year for 1-3 days, which means over a year they will be grazed for up to 10 days. But the severe drought of the past few years has meant some of the paddocks have only been grazed once during the year.

We aim to achieve 100 per cent groundcover 100% of the time and this has been a challenge at times during severe drought. Groundcover as low as 85-90% has occurred in some paddocks but we have always given those areas extensive rest and recovery time to ensure 100% groundcover again before any further grazing.

### Saltbush

We first planted saltbush during 1998 as a drought fodder reserve and now more than 365,000 saltbush plants cover a quarter of our property in all sorts of configurations: block plantings, straight alleys, squares, herringbones, triangles, concentric circles and spirals. Initially, we planted in blocks and then alleys 20 metres apart as this configuration gave us a balance of perennial

grasses and saltbush. But we found even short lines of saltbush in opposite directions to prevailing winds reduce wind runs.

Planting saltbush on a slight curve or along the contour breaks the wind flow. This helps to create micro-habitat, with more shelter, shading and moisture retention.

We manage the saltbush as we do the other perennials plus there is a structural grazing requirement, making sure the shrubs are sufficiently pruned and don't grow higher than the height of the grazing animals.

This means saltbush paddocks are grazed for longer periods than other paddocks but they are also given a longer rest period than those without saltbush.

### No-kill cropping

We have been using our no-kill cropping method since 1996 and it allows us to grow crops within grasslands rather than replacing grasslands as conventional systems do. It's an environmentally friendly method that slashes input costs and gives us greater flexibility and helps us regenerate degraded areas.

All components of the grassland are retained and we don't apply chemicals or fertilisers. Our grasslands respond well and are profitable in almost all circumstances because it focuses on profitability rather than productivity.

For the first time we sowed 140 hectares of cereal rye, as it has been found to perform well both economically and biologically.

Cereal rye has a tough straw that remains for a longer period than other crop species and helps promote regeneration. The crop germinated well but unfortunately provided some great early feed for a swarm of locusts.

### Looking to the future

Our biggest challenge is to ensure we are true to our long-term goals and not being drawn toward short-term treatments that don't address the basic cause. We see opportunity for us to continue to show the way with deep sustainability and applied innovation.

We have achieved a balance between profitability, sustainability and lifestyle aims by putting people first, long-term landscape function second and profits as the means by which the first two aims are achieved.

Our future plans are to achieve more diversity in shrubs and we will direct seed more wattles and other shrubs during the next few years. The aim is to provide grazing animals a more diverse diet, which we believe may lead to reduce methane emissions. These experiments are long term so maybe in 5-10 years I might be able to give an early opinion on the results." 🌱

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By John Friend, I&I NSW

## science behind the story

- **Bruce's system has a number of strong points including increased biodiversity, reduced erosion potential, low input costs and year-round water use.**

A current NSW Industry and Investment (I&I NSW) trial and the national EverGraze® project at Panuara near Orange are comparing a high-intensity grazing management system (similar to Bruce Maynard's), a lower (four-paddock) rotational grazing system and a set stocking system. The trial shows there has been more herbage mass in an intensive rotational system compared with the other systems. The pasture composition between the three systems showed little differences, except for more annual grasses during spring in the intensive rotational management system. Weight gain per lamb was higher in the less-intensive systems but total lamb production was higher in the high-intensity system due to a higher stocking rate.

Based on this trial, Bruce's grazing strategies should result in higher pasture production, higher levels of groundcover and increased livestock production compared with either set stocked or lower-intensity grazing rotation systems.

Although saltbush is low in nutrients, it can provide a valuable alternative fodder. Work on windbreaks has found they can reduce wind and subsequent evapotranspiration to at least 20 times the height of the windbreak. This can increase pasture production and extend it during drier times. Saltbush's low water use characteristics also mean it does not compete strongly with pastures for soil water – this can be a problem with traditional tree windbreaks.

No-kill cropping introduces an annual crop during winter, when summer-growing (C4) grasses are dormant and there is available moisture for a crop. This often results in harvest failure, but pasture croppers such as Bruce take advantage of the extra

feed supplied by the crop in the event of crop failure. Soil moisture and nitrogen are usually the two most limiting constraints in a no-kill system. Where herbicides are not used, failure to apply post-emergent herbicides can further limit crop yields. However, producers' goals need to be taken into account and no-kill cropping is a useful tool for producers who concentrate on grazing enterprises and only expect to harvest a crop in above average years.

- **John has more than 20 years experience in the private and public sectors. He has worked on agronomic, farming systems and soil science issues and currently coordinates I&I NSW's soil and salinity extension programs.**

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# “I wish I had more saltland...”

One would have to dig pretty deep to find a farmer more passionate about combating salinity than Lex Stone. The animated, self-confessed conservationist says he'll never walk away from doing his bit to constructively lower the water table as he discussed with Laureta Wallace.

“Twenty five years ago I worked on engineering solutions to pump groundwater out of here,” Lex said.

“Then I woke up and thought ‘hey we have this water – let’s use it.’”

We have an ocean under our back paddocks and while its not quality water – water’s water.

We’re living in a dynamic environment with climate change and global warming and we need to find strategies to cope with it.

When thinking of ways to use the ‘problematic’ water, I consulted with Dr Ed Barrett-Lennard from the Department of Agriculture and Food, Western Australia (DAFWA). He took one look and said, ‘you need to get stems in the ground – as many as you can’.

So with help from the Saltland Pastures Incentive Scheme, I created, what I like to call, ‘living haystacks’ – alleys with different plants integrated together – rows of oldman saltbush, Eyre’s Green Giant with barley in between.

Through the Saltland Pastures Association I learnt a whole new set of skills – we now have a home nursery where we cultivate saltbush seeds and then direct drill them.

## farm info.

**Case study:** Lex Stone

**Location:** North-west of Corrigin, Western Australia

**Property size:** 1200 ha

**Annual rainfall:** 250 mm

**Enterprises:** Wheat, barley, Merino sheep

**Soil type:** Sand over gravel



Integrating saltbush with barley stubble provides a living haystack for Lex Stone’s Merino sheep.

## key points

- With some lateral thinking groundwater can be used to advantage
- Saltbush and barley paired in an alley system provide a complementary livestock feed source
- Finding the right plants for saltland is the key to increasing productivity and keeping salinity at bay.

### Grazing management

This year we used the 120 hectares of ‘living haystacks’ to run 1000 joined ewes. We let the sheep into the saltbush/barley stubble alleys during about mid-April. We left the alleys ungrazed until autumn because the saltbush pumps the most water from the ground during summer and when it has full leaf cover.

The barley had previously yielded 1.8 tonne per hectare and was of malt quality.

We didn’t feed out lupins or hay at all. The ewes grazed the alleys for about three months. They really belted the saltbush.

This year we had a 110 per cent lambing rate and our wether lambs brought \$110 per head and our ewe lambs \$85/head.

### Keys to success

The keys to the success were the fresh drinking water, barley and saltbush. Because the saltbush is sucking so much salt from the ground the saltbush feed is pretty salty for



sheep to eat. Therefore, the sheep need a good, reliable fresh water source.

Don't get me wrong the saltbush isn't sheeps' number one preference – they go for the barley stubble first and then eventually get onto the saltbush.

I'm not a big numbers man but I'd have to say now that our alley paddocks are the most profitable on the place.

I'm actually considering the bold move of removing some of the saltbush from the tightly-planted alleys, because I believe the water table has been sufficiently lowered to allow wider bays of barley to be sown again.

I say thank goodness we have this water resource underneath – it is a huge resource. Thank goodness for sheep also. Other farmers shake their head at my statements but I have people come and visit the property each year to view our alleys. They only need to look at my paddocks compared with the salt-smothered paddocks of adjacent farmers to see how the alley system works.

I'm looking at incorporating a wider-range of salt-tolerant plants in the future such as salt-tolerant wheat. As well as a production imperative, I believe farmers have an environmental responsibility to tap into their underground water and use it. Otherwise it



Lex Stone thinks the sky is the limit for salt-tolerant perennial plants on salinity-prone land.

will cause ecological problems further down the line in rivers and streams.

Western Australian has 75% of Australia's salinity and here in the Avon catchment we have 50% of that. We can't afford to walk away from the issue – I'm certainly not going to. I wish I had more saltland!" 🌱

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## science behind the story

By Dr Ed Barrett-Lennard

- Lex has seen the writing on the wall and acted accordingly to combat salinity on his property. There is no doubt saltbush has a real role in reducing water tables – basically green leaves transpire water. As a result, there are a number of benefits that flow from the saltbush/barley stubble system.

There is anecdotal evidence that saltbush provides shelter for lambing ewes – which is reflected in the increased lambing percentage. Saltbush is also a great source of Vitamin E. It is a well-known fact that many sheep suffer from Vitamin E deficiency during summer. Farmers who just hand feed grain are not addressing this problem. The combination of green feed (the saltbush) with the grain left on the barley stubble and even the barley leaves provides energy, protein and Vitamin E.

The system also spells the new-season winter pastures allowing them to properly establish and get away.

It doesn't surprise me Lex wishes he had more saltland. Smart farmers are becoming aware of the opportunity this water presents them. However, it is important to be able to recognise what type of salt-affected land can be 'saved'.

We're not talking about the acutely-affected land but rather the moderately-affected, 'at risk' land. This is where Lex has been prompted to take action. He also has the advantage that his soils are relatively sandy, so if the water tables are drawn down, there can be a large decrease in salinity at the soil surface.

By putting salt-tolerant perennials back into the landscape to increase water use, he is paving the way for the long-term viability of his cropping enterprise. But essentially he has two products in one

system – a cropping operation and also a sustainable livestock enterprise.

Lex is correct in his desire for more salt-tolerant plants – especially for more salt-tolerant cereals. The Future Farm Industries CRC is definitely a stakeholder in seeing such new varieties develop.

- Dr Ed Barrett-Lennard is principal research officer in the Department of Agriculture and Food, WA and Professor in the Centre for Ecohydrology, School of Plant Biology, at the University of Western Australia.

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# Lucerne provides flourishing feed for summer

**A**s south-west Victoria enjoys the wettest season for about a decade, John Lyons reflects on the ability of his perennial pastures to respond to the varying conditions.

“We run a mixed farming operation across two properties – *Warooka* and my father’s property *Coonara* – and perennials have always played a role,” John said.

Traditionally, we have had a mix of perennial ryegrass and phalaris, but more recently we have introduced lucerne into the system to provide green feed over summer and allow us to better finish our lambs.

## Lifesaving lucerne

I tried lucerne years ago, but didn’t have much success – probably didn’t put out enough lime and it didn’t survive terribly well.

Then during 2005 we tried it again with an 18-hectare paddock.

I sowed the paddock during spring and with no significant follow-up rain I’d almost written it off.

It was hit by grasshoppers, then kangaroos and I thought that was the end of it. But we had about 75 millimetres of rain in a single downpour during the middle of January and the lucerne took off overnight.

That dry season had prompted us to carry out a water supply stocktake to calculate how long we could continue to keep sheep on.

## farm info.

**Case study:** John Lyons

**Location:** Hamilton, Victoria

**Property size:** 2207 ha

**Mean annual rainfall:** 635 mm

**Soils:** *Warooka* – sandy loams, *Coonara* – buckshot gravels and sandy loams

**Enterprises:** Wool, prime lambs, canola and cereals



Photos: John Lyons

*John Lyons has sown lucerne (foreground) to provide green feed during summer when the feed quality of annual pastures (background) is limited. Perennial ryegrass, phalaris and clover provide feed on soils unsuitable for lucerne as both grazing pasture and hay.*

## key points

- With careful establishment and management lucerne can provide plentiful summer feed during summer, responding quickly to summer rainfall
- Phalaris management is critical to maximising the benefits and avoiding any toxicity risks in sheep
- Winter cleaning keeps pastures free from annual grasses, leaving highly feed for hay production for grazing
- Tall fescue is an option worth investigating for soils that cannot support healthy lucerne production.

We decided that the water would have run out by the end of January – but the rain fixed that.

The sheep went on the lucerne two weeks after that rain and they couldn’t keep up with the feed.

The next year (2006) we sowed another 30 ha and 40 ha this year. This last paddock will qualify for a local Catchment Management Authority grant for establishing lucerne to manage excess soil moisture.

### Seeds of success

Our more recent success with the lucerne has come from ensuring the country is well prepared – limed and effective weed control before sowing.

I also think we may be more successful sowing lucerne alone not in a mix as the sheep give it a hiding compared with the other species.

Grazing management is very important with lucerne. We’ve split the 30-hectare paddock into two 15-hectare paddocks and the 40 ha will be split into four 10-hectare paddocks to allow us to finish off our lambs more effectively.

We weigh our lambs, separate them into about three groups according to weight – the top group will be ready to go, just waiting for a contract the lighter groups need a bit more feeding.

When the prime lambs have gone we will run the spring-drop Merino weaners on the lucerne.



Perennial pastures stay green for longer during spring and respond to summer rain, providing better quality feed.

Another benefit is that the lambs run on perennial pastures do not get infested with grass seeds.

### Wet feet

Lucerne doesn't like wet feet. The paddocks I have put it in have been dry until this winter, but it has been wet this year for short periods through winter and spring.

I winter clean the lucerne pastures with sprayseed and diuron to keep them free from annuals, such as barley grass and silver grass. But this year a wet patch in the paddock hasn't survived that treatment well – I think it was a combination of rain, spray and grazing pressure.

### Supporting species

Not all our soils are suitable for lucerne, we have a mix of phalaris and perennial ryegrass pastures on these soils.

We have phalaris pastures that are more than 30 years old but sometimes they cause problems – we've lost a few sheep over recent years to phalaris staggers.

We need to manage the grazing of phalaris to prevent the sheep from suffering phalaris toxicity – but it remains integral to our system.

Sheep with empty bellies should not be put onto paddocks with a high phalaris content. Our strategy is to ensure the paddocks close to our shearing shed and yards have a greater proportion of other plants such as perennial ryegrass and clovers. This way if sheep have been in the shed for some time they are not going directly onto phalaris. Paddocks out the back are fine to have a higher phalaris content, I just need to make sure the sheep aren't empty when they move onto them.

We've had the wettest winter and spring for about 10 years and although phalaris in some paddocks hadn't even shown its head in recent seasons, this year we're having trouble riding the motorbike through it.

Some of our phalaris has been here since the early 70s, established by direct drilling using a mix of paraquat and diquat – an approach ahead of its time.

Tall fescue is something we are investigating. A paddock has been spray topped during spring to control barley grass and silver grass. We'll direct drill the fescue during autumn and will include a perennial clover in the mix, possibly some perennial ryegrass as

well. Being summer active, the tall fescue will provide another summer feed option on country that doesn't suit lucerne.

We have tried Haifa white clover, but sheep and white clover don't work too well – the seed sets too high and the sheep eat the seed, so the clover ends up dying out.

I think we'll go with something more prostrate like strawberry clover, which sets seed closer to the ground.

### Keeping it clean

I like to keep my pastures clean and free from annuals as much as possible. A boomspray is used quite often with an MCPA spray graze to keep out the capeweed. Winter cleaning with gramoxone and simazine in selected paddocks helps to control barley grass and silver grass. This way I can count on getting good clean pasture hay during spring, as well as a good grazing paddocks. 🌱

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Supported by



## science behind the story

By Lachlan Hurley, Landmark

- John has some productive and persistent pastures, which are the result of sound grazing management and careful maintenance post establishment, including effective weed control and a good fertiliser history.

Lucerne provides a source of high-quality feed to extend the growing season. However, paddock selection is critical due to wet our winters. Lucerne requires free-draining soils, undulation or some form of drainage. However, it does dry the soil profile considerably, and what was once a marginal paddock, drainage wise, can be a well-suited paddock if lucerne establishes successfully.

Lucerne does not tolerate acid soils and lime is a must – preferably 18 months out from sowing.

Although John's fertiliser history is sound due to soil type, potassium is applied annually at maintenance rates, along with trace elements – copper, zinc and molybdenum.

Weed control prior to sowing is essential and John sows his lucerne during early spring, typically after a double knock down, plus trifluralin.

A sowing rate of 10 kg/ha, with inoculated seed provides good groundcover and allows seedlings to compete with any remaining weeds. Inoculation is critical as the typically low pH soils provide a hostile environment for rhizobia. It's common to see nitrogen-deficient legume crops in the area! Molybdenum applied as a foliar or with fertiliser, also will encourage nodulation.

Insect control during the first three months after germination is important

Rotational grazing is critical for success with lucerne, not only for persistence but also getting the most dry matter from the paddock.

Phalaris and winter-active fescue provide a good fit with lucerne – deep-rooted perennials are certainly the most productive species. They provide terrific autumn/winter production and are well suited to sub-clover as a companion species, which is dominant in John's soil type.

- Lachlan Hurley is a Landmark agronomist based in the Hamilton region of Victoria.

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# future farm

PERSONAL STORIES FROM AUSTRALIAN FARMERS

“We were absolutely gobsmacked with what the paddock did – we started with our worst country and it just transformed it to be some our best feed in no time.”

Marty Brennan, farm New South Wales (see story, page 4)

“The saltbush has proven to be a valuable addition to our farm, stabilising the sandhills, increasing stocking rates and also has the added benefit of providing important shelter to lambing ewes.”

Peter Kroehn, farmer South Australia (see story, page 8)

“Perennial pastures stay green for longer during spring and respond to summer rain, providing better quality feed.”

John Lyons, farmer Victoria (see story, page 14)

Future Farm 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 their 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](http://www.futurefarmcrc.com.au)

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