

salt

magazine

The Magazine of Australia's National Dryland Salinity Program

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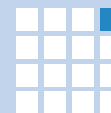
Smart water management reduces salinity risk



Personal stories
of Australians
combating
and learning
to live with
dryland salinity

National
**DRYLAND
SALINITY**
Program

Welcome to SALT magazine



The underlying cause of dryland (or secondary) salinity, the clearing of deep-rooted perennial vegetation and its replacement by shallow-rooted annual crops and pastures, has been well-known for almost a century. Why, then, has it taken so long for this issue to be recognised and placed firmly on the national agenda?

One answer may be that until a little over a decade ago the full extent of land suffering from, or at risk of, dryland salinity was not recognised. There was certainly plenty of saline land in Western Australia, and in the eastern states saline discharge features were recognised as a 'natural' part of the landscape in western Victoria and New South Wales. However, we did not have the tools to identify what we now recognise to be a much larger area of productive land that is at risk of salinisation.

Another reason is that although the problem and its cause were recognised, what could be done about it? Once again, we did not have the biophysical understanding required, or the confidence in potential methods to reduce or even reverse the spread of dryland salinity. It is only recently that work to improve farming systems, replant deep-rooted perennial vegetation or to consider engineering solutions, has provided us with the sort of information needed to spend public and private funds with some security that the results will be worthwhile.

Another particular issue has been that

recharge and discharge areas are often at considerable distance from each other and, until recently we had not tackled the economic, social and cultural issues associated with this separation of payers and beneficiaries.



John Lovett

Another, and I believe most important, reason for our slowness to address salinity has been that its complexity is much greater than at first thought. Thanks to recent research supported by the Grains Research and Development Corporation and the National Dryland Salinity Program, amongst others, and to the work of many other groups, including the National Land & Water Resources Audit, we now know that groundwater systems vary widely across different catchments.

Some are slow to respond to changes in recharge quantity, while others respond much more quickly. Some are local systems, where cause-and-effect can be readily seen, while in regional systems it may be difficult to link land use change with the impact it has caused. Some systems have the capacity to deal with increased recharge by moving increased volumes of groundwater and associated salt, while others cannot.

Salt is not stored evenly everywhere in catchments, and rising or moving groundwaters may or may not interact with these stores. The essential lesson to be learnt from this complexity is that a 'one-size-fits-all' strategy will not be successful in dealing with dryland salinity.

If we are to direct public and private investment to where it will be most effective, there are some underlying characteristics that must be known in each location. Recent work is moving to define the core information needs, and to develop an effective system of marshalling and analysing this information.

This will need to be done for each catchment or sub-catchment before landholders, as well as government agencies and the taxpaying community, can be confident that we are applying resources in the best way to meet national and local objectives in managing this national challenge.

Guest columnist:

John Lovett, Managing Director,
Grains Research and Development Corporation

Our cover

Converting high salinity risk areas from cropping into a mix of perennial pastures has allowed northern NSW farmer Charlie Widdis to mimic the water use patterns of the natural vegetation, while retaining the ability to continue a productive summer and winter cropping program. Groundwater levels fluctuate with seasonal variations in rainfall, however the level of salinity is slowly decreasing and affected areas are getting smaller.

- See full story page 6

Photo: courtesy DLWC



Any recommendations contained in SALT magazine do not necessarily represent the policies of the National Dryland Salinity Program partners. No person should act on the contents of this publication whether as to matters of fact or opinion or other content, without first obtaining specific independent professional advice which confirms the information contained in this publication.

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Other contributors



Trenches bring sweet results

Case study: Col Wolfenden, 'Laguna'
Location: Rockhampton district, central Queensland
Property area: 400 ha
Average rainfall: 850 mm
Enterprises: Sweet potatoes, pumpkins, peanuts, maize, water melons



As one of Australia's largest sweet potato growers, Col Wolfenden produces several thousand tonnes each year and supplies numerous Australian markets including being the major national supplier to Woolworths. He is the only major commercial grower of sweet potatoes in central Queensland. As Col explains to Mark Warnick, he decided to drain a waterlogged area of his property in drought conditions in 2002 to source underground water and help alleviate his salinity problem all at once.

The result was that, according to Col, "I spent \$5,000 on excavator fees but was able to keep my \$200,000 crop of sweet potatoes on eight hectares growing with the water I found filling the trench until rain fell in June. Without this water, they would have died. I wish I could find some similar investments.

I moved on to my property in 1958. In that year, we received 900 millimetres in a couple of weeks. After that, I noticed salinity outbreaks and they have been with me ever since. Clearing may have contributed to this; since then planting trees has helped but not beaten it.

We have various areas turned saline. We had 88 ha of land highly saline but that has now been converted into water storages. We have another 20 ha of our country with a major salinity problem. Our neighbour has a salinity problem as does our whole district of Rossmoya.

When I first came here, my property and the surrounding area was dairy, grains and grass. In 1982, I changed to sweet potatoes and peanuts.

I irrigate everything on my farm. I had ring tanks installed over the previously saline area of 88 ha and I can irrigate from the local creek in the good rain times.

In April of 2002, I had an excavator in to dig my first trench around the base of my



Photos: Mark Warnick

Central Queensland sweet potato grower Col Wolfenden talks to Natural Resources & Mines senior lands resource officer Bruce Forster at the groundwater interception trench on 'Laguna'.

red volcanic soil hill: it was 150 metres long and 6 m deep. Width varies between 2 m at the bottom to 6 m at the top. I also had two narrower trenches of 350 m each dug at either end.

From this trench, I am able to get the equivalent of 40,860 litres per hour. Currently I am pumping this water out for my crops but the concept is to enlarge the trench into a large storage.

The water has been varying between 700 and 1200 $\mu\text{S}/\text{cm}$ which has been okay for me to irrigate with.

Below the trenches is one of my biggest current salinity outbreaks. It borders the creek and has killed off much of the vegetation.

I ran a field day here late last year and a number of people got quite excited. As a result, a number of landowners in other districts have tried similar trenching but with limited and varying success. In this district, I know of eight similar trenches that have been as successful as mine.

We have had our two driest years, in 2001 and 2002, in 130 years and the groundwater has been as low as it gets but with the different trenches, there has been more groundwater pumped since April last year than in the previous 50 years.

There has been a dramatic increase in per capita consumption of sweet potatoes in Australia and many nutritionists are now recommending them. My peanuts last year were a total failure so being able to harvest my high-value crop of sweet potatoes was crucial to me and this was made possible by the water I harvested from my trenches.

•Col Wolfenden spoke with Mark Warnick, NDSP Communication Co-ordinator (QLD)

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Photos: Bruce Munday

Adapting the farming system to manage salinity

Like many farming properties in the Driver River catchment, this one has some land we would love to have more of and some we could easily have done without. Non-wetting sandy rises and salt-affected flats are a couple of examples that have always been a problem. However, over the last few years we have come to see that maybe we can do much better with this low value land.

We crop about 1050 hectares to wheat and barley (now entirely minimum till) with a medic pasture ley, and we run about 300 Merino ewes. We also have about 370 ha of remnant scrub and about 80 ha of salt-affected land.

The farming land around here was cleared in the 1940s and even then there was some salinity to be seen. We have aerial photos going back 50 years that show that the salt-affected land has at least doubled and new areas have appeared in some of our best cropping paddocks.

There was a dramatic increase in the area affected following the very wet years in 1989 and 1992 and we could see it taking out valuable cropping land and good native

Case study: Mick and Tara Kenny, Kimba

Location: Eastern Eyre Peninsula, SA

Property size: 1500 ha

Rainfall average: 330 mm

Soil types: sandy loam over sodic clay, deep sand on ridges

Enterprise: wheat, barley, wool



vegetation. This has made us think firstly about what we might do to prevent it spreading further and also how we might use some of that salty ground.

A couple of years ago the Landcare groups in the Driver River Catchment got together and asked Rural Solutions SA to prepare a salinity management plan as part of an National Heritage Trust (NHT) supported program. They worked with the local community and collected all the available data and then came up with a set of recommendations.

Among other things, their investigations showed that we are on an intermediate sized aquifer, meaning that there really needs to be a whole catchment approach to recharge reduction if we are going to make a serious impact. However, the fact that

significant expansions seem to have closely followed particularly wet years also suggests that the system responds quite rapidly. This has encouraged us to have a go!

The landscape in this part of Eyre Peninsula (EP) is dominated by dune swales, the flats being relatively fertile with good water moisture storage capacity. But the sandy ridges have low fertility and tend to be water repellent. Because the dune system is so jumbled we have tended to crop these sandy areas in with the flats, but it is only in an exceptional year that they return a profitable crop. In a dry year they are very prone to wind erosion and of course they are always potential recharge sites.

The thing that has intrigued us is that these sandy ridges are capable of growing

primrose and paddock melons without any management at all, so it should be possible to grow a useful plant like lucerne if you look after it. The Million Hectares program had been promoting lucerne for recharge control and we had seen some good stands growing in other parts of EP, so we decided to give it a go.

We sowed 23 ha of Hunterfield in 2001, part of a Driver River Catchment Group project supported by the NHT, and had an excellent result with about 15–20 plants per square metre. This year, following out-of-season rain in December we have cut it for hay, which is a nice bonus given current prices.

Lucerne is still presenting us with challenges and in 2002 we sowed a further 75 ha of Sceptre with not much to show for our effort. Non-wetting sand is a major problem, although in both years we have had good germination and initial establishment. But last year the season was against us and by the time we took the wheat cover crop out it was too late.

We have tried clay spreading on non-wetting sands but so far it does not seem to have helped. Despite the excellent results many farmers get in the upper South-East, we still have a lot to learn about clay spreading, particularly in terms of clay quality and trace elements.

We are still keen on lucerne for these sandy sites, but we need to improve the establishment practices because a failure is an expensive lesson. But there is only a limited history of lucerne in this district, so each year we are back on the learning curve.

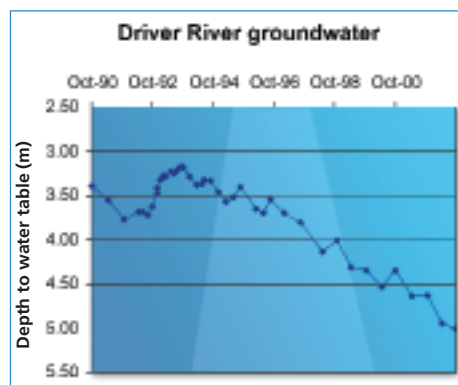
There is a lot of land through here that I believe is much better suited to lucerne than to annual crops. If we can minimise the risk of failure other farmers might take



Opposite page: Lucerne is proving a much better option than grain on some sandy rises for Mick Kenny.

Above: David Davenport (left), Rural Solutions SA and 'A Million Ha for the Future', and Mick Kenny where crops were grown shortly after land clearing.

Left: Salinity expanded significantly following major recharge events in the late 1980s and early 1990s (data from D Clarke, DWBC).



it up and collectively we could have a serious impact on groundwater recharge. Meanwhile, I am watching phase farming with interest.

Although the area visibly affected by salinity in the Driver is less than one per cent, it is much more on some properties and it is impossible to ignore. It has ruined the only fresh water storage on this property and as it spreads it is devastating the remnant vegetation.

We tried saltbush on several sites ranging from mildly to severely salt-affected but had only modest success. Again we are charting fairly new territory where there are many unanswered questions about what will do best on our saline ground. We have read about the impressive performance of saltbush in WA and puccinellia in the upper South-East of SA, but as with most plant systems we need to know what suits our own conditions.

Some of our saltland is now being colonised with samphire which might mean it is too far gone for rehabilitation. But there are still large areas of sea barley grass, which must have potential for more

productive use, particularly as we still see a future for livestock in our farming system.

We would like to see a lot more work done locally on saltland pastures, investigating what will grow best in this environment and how to optimise its production and sustainability. We hope that a group here will work up a research project for the Sustainable Grazing on Saline Land* program, as this seems to be the ideal way to answer some of these questions.

• Mick Kenny spoke with Bruce Munday, NDSP Communication Co-ordinator (SA)

* Sustainable Grazing on Saline Land (SGSL) is part of the wider Land, Water & Wool initiative - a partnership between Australian Wool Innovation Limited (AWI) and Land & Water Australia that focuses on sustainable and profitable wool production.

Key points

- Photo records show that salinity has doubled in 50 years
- Lucerne shows promise on key recharge sites
- In drier regions it pays to 'follow the book' when establishing lucerne
- There are still many lessons to be learned to manage salinity locally

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COVER STORY

Perennial pastures increase water use

Case study: The Widdis family
Location: Willow Tree, NSW
Property size: 1620 ha
Rainfall average: 600-650 mm per annum
Enterprise: Mixed farming and grazing



The Widdis family property ‘Boondari’ lies at the base of the Liverpool Ranges in north-west NSW. The soils on the property are rich and fertile but a few small areas are affected by salinity. These areas have been revegetated with perennial pastures and a system of response cropping was introduced to maximise water use and help lower the water table. Charlie Widdis describes his story to *Lisa Gray*:

We live on a floodplain and suffer from large amounts of run-on in times of flood, and consequently, waterlogging.

About 10 years ago we noticed a few bare patches of soil in the low-lying areas. There were a couple of possible causes including soil compaction or some sort of chemical build up. The idea of salinity was bandied around, but it wasn't until the neighbouring Landcare group also started talking about it, that we realised how potentially serious it could be.

Originally, the Liverpool Plains were covered in native perennial grasses. The soils are derived from volcanic basalts and naturally contain salt. They are also highly productive and around the 1960s the area was converted from grazing to cropping.

Overall, cropping systems seem to use less water than the deep-rooted perennial native grasses, so the heavy clays become saturated and salts in the soil are mobilised. Some water drains below the root zone. The combined effects of land clearing and the constricted geology of the sub-catchment



Areas at risk of dryland salinity on the Widdis family property in the Liverpool Plains region of NSW have been revegetated to increase water use.

slows the flow of groundwater. As a result the water table rises.

On our property, we noticed the crop yield was lower in the affected areas. That didn't worry us too much because the areas were relatively small. We were more concerned about the areas getting bigger and decided to get in early and prevent

salinity from costing more in the long run.

An electrical conductivity survey was conducted on the property and we used maps and aerial photographs to help us work out what we needed to do.

The high-risk areas were taken out of cropping and put into pastures. We wanted to mimic the water use patterns of the



Photos: DLWC

Charlie Widdis uses a system of 'response cropping' – putting a crop in as soon as there is enough moisture - to maximise use of available water.

natural vegetation and planted a mix of perennial grasses including lucerne, phalaris and fescue. It was difficult to get anything to grow on the bare areas. We tried planting pucinella but that wasn't successful, so we concentrated on the fringe areas and planted them to tall wheat grass.

Five years ago we introduced a system of response cropping, which means we put a crop in as soon as we have enough soil moisture. In summer we plant sorghum and sunflowers. In winter, we plant wheat on the slopes and triticale and barley in the low-lying areas.

Some time ago, we installed a network of piezometers and have been monitoring groundwater and salinity levels for several years. The groundwater level fluctuates with seasonal variations in rainfall, but overall, it has definitely lowered. The level of salinity is slowly decreasing and the affected areas are getting smaller.

Recently a soil pit was dug in a mixed pasture paddock as part of a field day. We could see that the soil profile had dried out and the salts had leached downwards. Even so, I am still very conscious of salinity.

One of our neighbours has a property that has never been farmed. It's one of the few remaining areas of native grassland in the district. The diversity of perennial grasses on his farm is amazing. His farm is productive, the soils are healthy and there

seems to be no sign of salinity.

Looking at his property makes me think it would be good to put more of our property back into native pastures. We are planning to do that over the next few years along with some tree planting and fencing – some of this will be assisted by the Liverpool Plains Land Management Committee.

Salinity is a community and a catchment issue. It's important for everyone to do what they can to improve the situation. It's a gradual process - some people are putting in trees while others are trying to maximise water use where it falls.

We have lots of low-lying areas on our property and need to do things differently to others higher up in the catchment; that's why we've been concentrating on our pastures and response cropping.

There are so many different options available. It's important to contact a salinity officer from DLWC, the Liverpool Plains Land Management Committee or NSW Agriculture to find which one will suit your situation.

We are fairly happy with the way we're managing salinity and are optimistic that things will be even better in the future.

• *Charlie Widdis spoke with Lisa Gray, NDSP Communication Co-ordinator (NSW)*

Key points

- Seek professional advice. Maps, surveys and aerial photographs are useful planning tools.
- Aim for a diverse mix of perennial plants.
- Response cropping systems can help maximise water use.

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Saltbush – ‘like money in the bank’

Case study: LJ and O Dawes, ‘Rutherglen’
Location: via Yealering, Western Australia
Property area: 4000 ha
Rainfall average: 300 mm
Enterprise: Grains, wool production, Merino stud



The Dawes family first planted saltbush to help overcome salinity about 15 years ago. Saltbush now covers about 200 hectares and because of its value may be extended to 1000 ha over the next five years, as Buster Dawes explained to Georgina Wilson.

Quailbrush and wavyleaf saltbush were the first saltland pastures tried at ‘Rutherglen’ at the instigation of son Tim, but after 15 years, those two varieties aren’t high on the shopping list.

“Quail is easy to grow and very palatable to the sheep, but just won’t persist here. If you have to replant every five years, it’s just not worth it,” Buster Dawes said.

Wavyleaf has persisted but is not very palatable, similar to old man saltbush. Top performer to date among the seven varieties tried is river saltbush – very palatable with the important bonus of natural regeneration, meaning minimal management effort after establishment.

“We look to see what’s eaten first and it is always river saltbush,” Buster said. “In the wet years we don’t use it, but it’s like a bank. It’s there when you need it in dry years – a reserve that you have to have.”

That saltbush proved a godsend for stock in summer 2002-03, following a dry winter when crops yielded about a quarter of normal on only 160 millimetres of rain. Buster also estimates a 10 per cent better wool yield from saltbush compared with other paddocks and useful prevention of wind erosion on formerly bare ground.

Stocking rate is more than a sheep to the acre (0.4 head/ha) for five months of the year. But it is important not to graze the plants too hard as some leaves must be retained to help plants survive the winter.

Soils on the Dawes property are very variable ranging from heavy clay to sand, and salt has appeared on both ‘dry’ and ‘moist’ areas affecting about a quarter of the land. Saltbush will survive on the drier



Buster Dawes admires a good source of river saltbush seed. Buster says saltbush must be supplemented with a ‘mixed grill’ of straw and good water to maximise stock productivity on salt country.

uplands but prefers the lower moist areas – country now unsuitable for crop but which supports barley grass, local bluebush and samphire.

Like many Western Australia wheatbelt farmers, the Dawes tried drains to remove salinity, but found they didn’t work well because of soil variability. Oil mallees were also tried, but with 11,000 thriving plants in the ground and no market, they have halted further plantings.

Instead, the saltbush plantings will be extended gradually to where salt scalds are growing and crop yields are lower over the next few years.

River saltbush produces seed in January, but in some years only. Seed collecting is tough – hard on the back as well as the hands in stripping off the branches - so the family normally collects some of its own seed and buys some in.

Palatability is unquestioned: sheep will even stand on their hind legs to reach it and Buster has seen them come down the hill in late afternoon, graze the saltbush for an

Key points

- Saltbush is a really useful reserve for stock in dry years, as well as helping to reclaim land
- Choosing the best variety is a trade-off between palatability and natural regeneration
- River saltbush is the best performer found yet for this location



Saltbush has been a good source of sheep feed in tough seasons such as 2002 and 2003.

Photos: Georgina Wilson

hour or two and then return to the dry pasture.

“But you can’t feed all saltbush. You’ve got to have sources of straw and pure water,” he warns. “Give them a mixed grill!”

A farm lay-out of paddocks that are not all saltbush but include some high ground which can grow other pasture while providing a refuge in times of sudden

flooding is recommended.

“You would do nothing with this country if you couldn’t grow saltbush on it,” Buster says. “On salty country you still have to pay some rates. This way you get a return.”

• *Buster Dawes spoke with Georgina Wilson, NDSP Communication Co-ordinator (WA)*

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Sustainable Grazing on Saline Land research commences

Saltland pasture has been a recommended response to salinity in WA for nearly 60 years but experience has shown that it does not work in all situations.

The grazing value of saltbush pastures is now being investigated as a Sustainable Grazing on Saline Land (SGSL) project, part of the wider Land, Water & Wool initiative.

Land, Water & Wool is a partnership between Australian Wool Innovation Limited (AWI) and Land & Water Australia that focuses on sustainable and profitable wool production.

The project involves staff from CSIRO, the Western Australian Department of Agriculture and the Co-operative Research Centre for Plant-based Management of Dryland Salinity.

Dr Ed Barrett-Lennard is co-ordinating a team working on the use of supplementary feed sources with saltbush to supply the energy needs of stock, and how to prevent sheep eating out the more palatable components of pasture while ignoring the rest.

He said recent farm modelling indicated that ‘moderately’ saline land could benefit more than ‘mild’ or ‘severe’ situations from revegetation.

“This autumn we will begin a trial on the Dawes’ property to compare animal performance on pastures that are supplemented with grain and/or low quality forage such as hay,” he said.

“While saltbush is a good source of protein for stock, its low digestibility, high

ash content and low energy levels make it less than ideal if fed on its own. Understorey plants such as annual herbs, grasses and legumes can help provide a balanced diet, or it may be worth bringing in extra grain or hay with dense stands of saltbush.”

With trials on several properties over the next few years, scientists should gain a much clearer understanding of where saltbush can work most efficiently.

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Old and new plants underpin this system

We took over this property in 1990, recognising that it would present major challenges. Ten per cent of the land is visibly salt-affected and most of the remainder is low fertility sandy country. We immediately set about designing a management system that would at least stabilise the salinity, and protect the sandy rises from wind erosion. This is all underpinned by extensive use of well-managed lucerne.

Our beef enterprise is vertically integrated with 2200 breeders, an AusMeat accredited feedlot with capacity to finish 1000 head, a wholesale beef brand (Coorong Angus Beef) and two retail butcher shops in the Adelaide Hills.

About 3600 hectares of sandy ground is now under lucerne (mainly Hunterfield and Flairdale) and we aim to sow about 400 ha each year. Low fertility non-wetting sand is a real challenge, so we generally sow a cleaning crop with a chicken litter mulch the first year, then next year drill lucerne into the stubble for wind protection and follow with a roller.

Lucerne is the critical component of this property and it must persist. We manage the lucerne by cell grazing, moving mobs of 200–250 head through 14 paddocks, 40 ha in size in each cell. We also cut all our hay and silage for the feedlot.

The property still has about 240 ha of native scrub now entirely fenced off from stock, partly thanks to National Heritage Trust (NHT) incentive funding delivered through the Coorong District Local Action Plan. This same program has assisted with some of our lucerne planting.

In our 13 years here we have not consciously monitored the extent of salinity, but there appears to have been some reduction as we now have volunteer lucerne growing further down the slope than we were initially able to establish. So, by reducing the recharge lucerne seems to be colonising a new niche.

With almost 700 ha of salt-affected land it is very tempting to look for profitable plants to grow there. Part of the problem is that the saline flats are under water for much of the winter making it very difficult

Case study: Richard Gunner, 'Wanderribby'

Location: Coorong District, South Australia

Property size: 6600 ha

Rainfall average: 450 mm

Soil types: Deep non-wetting sandy rises, saline flats

Enterprise: beef cattle



Photos: Bruce Munday

to sustain puccinellia or saltbush. Because we are completely landlocked, drainage is not an option either. The plant we really want is one that can withstand winter inundation, tolerate groundwater saltier than the sea and is palatable and nutritious for cattle.

Over the past few years we have become very interested in a clone of *Distichlis spicata*

that comes from Florida and has been selected for its forage qualities. We heard about some promising trials in Western Australia and decided it would be worth having a go here.

Distichlis, which is the same genus as the native Australia salt grass, seems to meet many of our requirements. It can tolerate being under water for several weeks in

winter; it is a true halophyte, thriving on saline conditions; and cattle actually select it in preference to lucerne (perhaps attracted by the salt).

With all these virtues you would think that *D. spicata* was the answer to all our salinity problems, but there are still many hurdles to get over. All the plants in Australia are males and must be propagated vegetatively and planted individually, making broadacre establishment an impossible task. We use a broccoli planter on our trial plots which is very laborious, but at this trial stage we are mainly interested in how well the plants establish and persist, the conditions they prefer, and their value as stock feed.

We have planted distichlis into several saline sites and monitored the results. Establishment has generally been patchy, but better on the sandier soils, whereas persistence seems to be favoured by heavier soils. We have not yet achieved the results they are getting at Wickepin in WA, but that could be because these C4 plants do better in their warmer climate.

It is often difficult to identify the cause of significant variations in success rate across a particular site. In WA they found a strong correlation between performance (establishment and growth) and levels of soil salinity as revealed by an EM38 (see caption), and this is something we are going to follow up here.

What we have found is that the plants respond well to fertiliser, with feed value testing out in January at 12-15 per cent crude protein, 60-70 pc digestibility and 8-9 pc metabolisable energy. As well, the



Opposite page: Salinity surveys using an EM38 (an apparatus for rapidly measuring soil salinity through electromagnetic induction) might help explain why distichlis is thriving only at the edge of the saltpan.

Above: Groundwater is readily available for irrigation of distichlis.

Below: Lucerne on higher ground, distichlis recently planted in saltpan.

cattle really like distichlis and it responds well to controlled grazing, but we have not grazed large enough areas yet to work out the stock's fresh water requirements.

Being rhizomatous it needs heavy grazing pressure to perform at its best and also seems to benefit from a degree of soil disturbance, which stimulates it to put out new runners. It will be a huge advantage to us that we can graze the salt pastures as part of our general grazing, rather than having to fence it out, and in that regard it will suit our rotational grazing system.

Distichlis will not be the answer to all our saline land, but it could be a valuable component. It should fit very nicely with puccinellia, providing green feed in summer whereas the pucci kicks away in autumn. As we learn more about the 'likes and dislikes' of both these plants we will have a much better feel for where to establish and manage them together.

This year we are trialing irrigation to see if we can improve the establishment by giving the plant a start. We have abundant groundwater 'at the doorstep' and it doesn't matter that its salinity is > 20,000 milligrams per litre. Once the plants get their roots down 1.5 m to this groundwater they should be able to survive any drought. We are always conscious of the weed

potential of new plants and we are aware that distichlis has attracted some attention. From our experience it spreads so slowly that is difficult to see it ever becoming a weed in this region. However, we agree that there should be protocols for where it can and should not be planted and suitable herbicide treatments should be developed for removing it.

• Richard Gunner spoke with Bruce Munday, NDSP Communication Co-ordinator (SA).



Key points

- Distichlis shows promise on saline ground
- Lucerne is a profitable key to recharge control
- We are still learning how to manage saline land

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Drainage, pasture management triples production



Left: The concept of a 'neighbourhood group' has allowed John Carr and his neighbours in the Woody Yaloak Catchment Group to focus on networking and solving environmental problems - and not be distracted by paperwork!

Photos: Jo Curkpatrick

John Carr at Rokewood in Victoria is an active Woody Yaloak Catchment Group member and has tackled an unproductive discharge area on his property. As he explains to Jo Curkpatrick, 'South Hills' is a low lying wet, salty paddock where only a few salt tolerant plants grew and when grazed, the stock camped on the saline areas leaving the soil exposed to wind erosion and the accumulation of salt.

"Historically the area had always been a bit swampy, however the lack of vegetation caused by the ponding of surface water, stock grazing and changes to the drainage on a nearby road seemed to compound the problem. The extent of salting varies across the paddock from being marginally saline to extensively salt-affected.

When we began monitoring the paddock in 1997 the water table was within two metres of the soil surface and the situation didn't look like improving. In April 2000 we used a laser-guided rotary drainer to form 25 beds which were sown in the spring of 2000 to a mixture of salt-tolerant pasture species including tall wheat grass and strawberry clover.

We applied 2.5 tonnes per hectare of gypsum and sprayed with Roundup at 1.5 L/ha to kill any remaining vegetation.

Analysis

	September 1999		August 2002	
	Marginally saline	Extensively saline	Marginally saline	Extensively saline
Salt (EC)	0.23	0.51	0.11	0.28
Soil texture	Loam	Clay loam	Loam	Clay loam
Phosphorus (Olsen)	10.2	11.0	18.2	13.3
Potassium (Colwell)	156	249	226	298
Sulphur (KCL40)	22.0	34.7	17.9	51.3
pH (CaCl ₂)	4.7	4.8	5.5	5.1

Table 1. Changes in key soil parameters at drain installation and three years later.

The paddock was direct sown with Dovey tall fescue, Dundas tall wheat grass and Palestine strawberry clover at a rate of 11 kg/ha with single superphosphate at 225 kg/ha. This year we top-dressed the area with 190 kg/ha of single superphosphate.

My estimate is that we have had a three-fold increase in production due to better drainage and improved pastures. The drainage created by the 25 m beds has allowed the salt to leach from the surface soil and the pasture species to establish successfully.

The salt level in the base of the drains has also reduced to below pre-drainage

concentrations and are currently between 0.32 and 0.36 dS/m (EC).

The depth of the water table since the beds have been installed has remained fairly constant at about 3 m, despite the 2001 rainfall being above the annual average. It was anticipated to see a marked increase in the water table but it appears the drainage has prevented surface water from soaking in.

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Woody Yaloak Catchment Group goes for innovative solutions

Case study: John Carr
Location: Rokewood, Victoria
Property size: 570 ha
Rainfall average: 525 mm rainfall
Enterprise: Merino sheep, wheat, canola, lupins



Since its establishment in 1992, the Woody Yaloak Catchment Group has consistently turned to innovation in its quest to achieve sustainable land and water resource management.

Formed to tackle dryland salinity and other local catchment problems, the Woody Yaloak Catchment Group now involves over 120 landholders in 28 neighbourhood groups covering 65 per cent of the catchment from Haddon to Cressy, south of Ballarat.

The neighbourhood groups have been developed with advice from Alcoa's Landcare Manager Ted Rowley who is based in Western Australia. They involve between three and 12 landholders with common interests and concerns and in most cases with adjoining properties.

The neighbourhood group approach enables landholders to share information and planning, and approach funding sources as one organisation through an executive committee representing groups, sponsors and agencies. The approach minimises paperwork, administration and funding processes, and streamlines the management of on-ground works. It also improves progress monitoring and the reporting of outcomes to funding bodies.

Neighbourhood groups are provided with facilitation support to plan five-year programs which are then presented to the executive committee to access appropriate funding for the activities proposed.

"The approach lets the groups get on and do their work without having to worry about all the paperwork," said Project Manager Cam Nicholson.

"This way people tend to stay interested, we can get others in the community



Drainage and improved pastures has resulted in a three-fold increase in production on a discharge area of John Carr's property.

involved and importantly, we are able to keep our sponsors."

Farmer John Carr believes there are a number of reasons why the Woody Yaloak group is successful.

"We took a practical approach and that is reflected in our motto 'Productive Catchment Management' - it's about being green in the black," he said.

"We've always tried to do the things people want to do on their own land and that builds involvement.

"You've got to bring the theory back to reality and show people the benefits."

• *John Carr spoke with Jo Curkpatrick, NDSP Communication Co-ordinator (Victoria)*

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Greg Ball and maritime pine, grown to reduce recharge to water tables and provide income.

Photos: Georgina Wilson

Managed forest eases salinity stress

Salinity has been a problem in this area for many years, and shows first with rising water tables on low ground. About 14 years ago groundwater pumping looked promising as a solution for us, but wasn't the whole answer. Two pumps are still working and we pipe water 2 kilometres to a nearby lake for disposal and use it for yabby ponds, but other tools were also needed.

About 10 years ago I began to look at trees to use extra water before it reached the groundwater. I'm not one to rush into things and I don't like doing things twice. Doing anything differently needs a management change, and I needed to feel confident that it would work.

Commercial tree crops for this area are limited. After a lot of thought, we planted 92 hectares of maritime pines with the Department of Conservation and Land

Case study: Greg, Glenys and Ben Ball, 'Fernihurst'

Location: Wagin, Western Australia

Property size: 4200 ha

Rainfall average: 425 mm (but only 60 per cent in last four years)

Soil type: Sandy gravel duplex

Enterprise: cropping, sheep, yabbies



Management, now the Forest Products Commission (FPC) in July 1999. They manage the trees under a sharefarming agreement, so it allows me to concentrate on managing the rest of the farm.

The pines are in three separate blocks on sandy country above the salt flats where they reduce recharge. FPC bears all the costs of establishment and if it failed completely it wouldn't have cost me anything.

Currently we have about 520 ha of saline

land, growing as the groundwater rises. Another metre or two and the area will double. The saltland has a feed value of only 10 per cent of the good land, so we needed to find some alternative uses for it.

FPC staff come from Katanning every few weeks to check on progress and are managing the rabbits, parrots and other predators. Maritime pine grows well on little rainfall, and received a little fertiliser at first but nothing since. Estimates are that growing on sand – not the good cropping

Key points

- Groundwater pumping was not sufficient so additional salinity management is being tried
- Tree sharefarming arrangements with the Forest Products Commission remove management hassles for the land owner
- Tree harvest is some years away, but whole farm output is reduced very little because only poorer soils are used



Six yabbie ponds use some groundwater and yield about 200 kilograms of yabbies each year.

country – they should yield about \$60 to \$70 ha/year, compared with \$30 to \$40 from crop. The stands should be thinned to 50 pc after 10 to 15 years when the trunks reach fence-post size, and final harvest will be after about 25 years. We need to plant more – maybe another 100 ha on low cropping soils – if we can be confident it will rain again.

Because sandalwood grows naturally around here, we have also tried 19 ha of sandalwood, but this is proving much slower to establish. First, you need a host plant such as jam (*Acacia acuminata*) or *A. saligna*, and plant the sandalwood beside it a year later. Because of the waterlogging fears they were planted on mounds, but the

last few dry years have caused very poor germination, and they might have done better in trenches. We have already replanted once but many sites will have to be replanted again this year.

But once sandalwood is established, the prospects are good for harvesting seed in about four to five years, branches in eight to 10 years and then the full tree after 20 years. Prices for sandalwood are high and we could expect \$150 ha/year if all goes well.

If we have an average to above-average rainfall year in 2003 we will expand the tree plantings and the yabbie ponds, to try and reduce water tables. Trees don't compete with normal cropping system but

help get a sustainable return from a shrinking asset base.

Piezometers show that the water table has risen 3 m in 12 to 14 years. It will keep on rising and these flats could all go salty in time. I think our efforts will be significant enough to change the final outcome, but don't know. We could lose another 200 to 300 ha before equilibrium is reached.

• Greg Ball spoke with Georgina Wilson, NDSP Communication Co-ordinator (WA).

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Future bright for maritime pines

Maritime pine (*Pinus pinaster*) is one of the main species identified in the Western Australian Government's Action Plan for tree farming.

This is a framework for co-ordinated action to integrate tree crops on farms within identified 'cells' to enable sustainable development of regional timber processing industries and deliver significant environmental services.

Through a commercial sharefarm agreement between the farmer and the Forest Products Commission and/or investor, farmers receive an up-front payment for cleared, fenced land suitable for trees. A new commercial package offers increased up-front payments and more flexibility to combine trees with normal farming.

Maritime pine is well suited to lower rainfall zones and better suited to poorer soils than the more familiar *P. radiata*. The

main species promoted in the medium (400 millimetres plus) rainfall zones are maritime pine, eucalypts for sawlogs and sandalwood.

The maritime pines on Greg Ball's property were established by the Forest Products Commission and funded by BP Kwinana as part of its contribution to the salinity strategy and sequestration of carbon dioxide. Under the BP arrangement farmers can also have 10 per cent of contracted land planted with native landcare species such as sandalwood, York gum, wandoo, black wattle and swamp oak.

After contributing land, the owner can leave the Commission to do everything else – preparing it, supplying and planting seedlings, controlling weeds and insects during the crucial first two years, managing and monitoring growing trees, thinning, arranging final harvest and haulage and marketing the timber. Farmers have

opportunity to perform some establishment and tending operations at contractor rates.

As well as initial payments farmers will share harvest profits and have the option of revenue from carbon credits. The trees, in turn, help control salinity and waterlogging through lowering water tables, control wind erosion and provide shade and shelter for stock.

Since 1995 about 16,000 ha has been planted under sharefarming agreements and 25,000 ha in State Forests. In the Albany-Katanning-Mount Barker area farmers, including Greg Ball, have planted 4,000 ha.

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Recognising the hazard in the Apple Isle

Dryland salinity doesn't stand out like a 'sore thumb' in Tasmania and isn't threatening agriculture across large areas, but it is a growing hazard with more recent intensive land-use practices. Unlike many areas across mainland Australia, Tasmanian agriculture has an opportunity to do something before it is too late. As Jo Curkpatrick reports, some farmers are determined to make a difference.

Around Waterhouse and Tomahawk in the north-east of the State the Department of Primary Industries, Water and Environment is undertaking a study of the impact of land-use change. This has included an EM (electromagnetic) survey and groundwater monitoring program.

The aim is to help local farmers including members of the North East Coast Landcare group manage salinity and other land degradation hazards.

The region was opened up for soldier settlement in the 1940s and with rainfall around 700 millimetres a year supports sheep, cattle and dryland crops on sandy loam soils. Waterlogging and poor drainage can be problems and salinity is evident in some drainage lines and low-lying areas.

In recent years the region has seen growth



Photos: Jo Curkpatrick

in irrigated and more intensive agriculture including potatoes, poppies and dairying. Centre pivot irrigators are now a common sight and without careful management farmers in the North East face an increasing risk of salinity and soil degradation.

Land Resource Assessment Officer Rob Moreton is working with farmers to better understand salinity in the landscape. "We know there is salt in the landscape because it's a maritime environment and there are a few areas of salt-affected land with the usual plant indicator species present... but we need to know more about hydrology in this area and the way that salts move in these sandy, soil landscapes."

Mandy Carter has two properties in the Waterhouse area and knows the risks.

"There is already evidence of salinity and we need to watch our water quality, but I think that with good drainage and pasture choice we can make it manageable," she says. "We're now fencing our drains and

sowing fescue and tall wheat grass instead of annual ryegrass, and we're also interested in using balansa clover."

Further south to Ouse, Bernard Brain farms 1000 hectares with his brothers.

Over the past 25 years the Brains have diversified from dryland sheep and cattle to incorporate a range of new irrigated crops including poppies, fennel, black currants, mint for essential oils, parsley, cabbage seed, winter wheat and barley.

"We have been growing poppies since the mid 1970s," said Bernard Brain. "In the 1980s we put in a fully automated irrigation system to water up to 120 ha across 10 paddocks.

"We pump the water from the Ouse River into a dam and then gravity feed the travelling irrigators.

"There have been small salt scalds on the property going back to the 1940s and in the 1960s Palestine strawberry clover was used to revegetate them. We've also used

Key points

- New, more intensive farming systems has resulted in Tasmanians working smarter to reduce the risk of dryland salinity.
- Expanding irrigation areas mean heightened monitoring of water use and potential for soil degradation
- Carefully-planned drainage is helping to protect high-value crops from waterlogging and the risk of dryland salinity.

tall wheat grass on one scald.

“The water tables are fairly high in winter and with our duplex soils and yellow clays that turn to slop in wet winters when irrigated we have to be careful we don’t encourage more scalds.

“To make sure we are not over-irrigating we have been monitoring the water table and groundwater for about four years and the water table hasn’t changed much – it rises in the winter and falls in the summer, but doesn’t change with irrigation. We are also growing perennial crops such as fennel



which is deep-rooted. It grows to about two metres so when we harvest the seed there is plenty of organic matter.”

Drainage contractor Tim Terry is another Tasmanian concerned about the spread of dryland salinity in the State.

Tim has been doing underground drainage for about 25 years in Tasmania and on the mainland, taking his machine from the MCG to Port Arthur, to vineyards and farmlands.

“We survey the land to check the outfall and then, guided by GPS, lay a pipe at between one and 1.2 metres deep and surround it with blue metal in one pass using an English machine designed in Holland,” said Tim. “It’s a purpose-built machine that weighs 28 tonnes and carries a hefty 300 horsepower engine.

“It is not a cheap process, but with high value crops like poppies the \$1500 a hectare investment is paying off and the farmer is insured against waterlogging and salinity.

“In Europe, underground drainage is quite common and in Israel farmers have shown that it has an application in the broader scale, but farmers have to look at whether the spending is warranted in terms of crop returns.

“Careful planning is important and you have to think about where the drains are taking the water. In Tasmania we have the benefit of our proximity to the sea and high rainfall, which keeps the salt water on the move.

“I believe we can nip the dryland salinity problem in the bud, but by crikey there’s some education to do.”

• Rob Moreton, Mandy Carter, Bernard Brain and Tim Terry spoke with Jo Curkpatrick, NDSP Communication Co-ordinator (VIC)



Opposite page: Mandy Carter, Richard ‘Pug’ Gibson and Rob Moreton in north-east Tasmania: good drainage and good choice of pasture is helping to manage dryland salinity.

Above: Tasmanian drainage contractor Tim Terry: “Careful planning is important; you have to think about where the drains are taking the water”.

Left: Bernard Brain in a field of poppies, Ouse, Tasmania. Switching to high value, irrigated crops has resulted in new interest in the risk of dryland salinity for many Tasmanian farmers.

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Saltbush savings see out a tough season

Case study: Graeme and Yvonne Hibbard, 'Mittagong Park'

Location: Narrandera, NSW

Property size: 760 ha

Rainfall average: 425 mm

Enterprise: Wheat, prime lambs, Poll Dorset Stud



Graeme and Yvonne Hibbard own a property 'Mittagong Park' on the southern end of Bogolong Hills, 15 kilometres east of Narrandera. Like many farms in the district, the land is used primarily for wheat and sheep production. As Graeme explains to Lisa Gray, five years ago they planted 30 hectares to old man saltbush to help manage salinity on their property and so far they have been very impressed with the results.

We knew our property had a salinity problem when we bought it back in 1994. There was a drought that year, but the dam in one of the paddocks continually overflowed as water seeped up from under the ground. There were also patches of land in that paddock that were either poorly grassed or completely bare.

We wanted to stop the salt scald from spreading by using the excess groundwater effectively, but we also wanted to maintain or increase our productivity. We came across an advertisement for old man saltbush and thought it might be worth a try.

Instead of just planting the affected areas, we decided to put the whole paddock (30 ha) into saltbush. We found out the correct density and spacing to plant. The area was ripped to a depth of 30 centimetres and the saltbush was planted using a tractor mounted tree planter. Pastures were established in between the rows.



Photos: Matthew Crosbie, DLWC

We only use the saltbush to supplement our pastures in autumn or in times of drought. Most of our pastures are a mix of sub-clovers and we usually plant some oats for grazing. In the last couple of years, we've also planted lucerne and chicory to graze the stud sheep on over summer.

The saltbush is grazed regularly to stop it

from getting too tall and woody. Most years, we put around 1000 ewes in the paddock from March to May and let them eat it off pretty hard. Then we let the paddock rest for nine months to give the plants time to recover.

This region has traditionally been used for wheat and prime lambs, so planting saltbush was probably seen as something a little bit out of the ordinary.

Saltbush definitely isn't for everyone, but it suits our location and fits in with our farming practices. So for us, there have been many benefits from planting saltbush.

Having the saltbush is a bit like having a 'living haystack'. It's a pretty good maintenance feed being high in protein as well as vitamins and minerals.

The protein content is similar to that of clover although it takes a little longer for the sheep to digest. But, the saltbush is fairly drought tolerant and can provide good quality feed at a time when the pastures tend to be drier and have lower nutritional value.

The pastures in and around the saltbush have improved because the grasses have dominated the weeds. The saltbush helps trap airborne grass seeds and this provides a suitable environment for native grasses to re-establish.

Autumn tends to be pretty dry and it's critical for the sheep to have good feed during the lambing season. We've made



Above: Graeme Hibbard with a block of old man saltbush. The saltbush is strategically grazed throughout the year, providing a valuable source of fodder and a groundwater management tool.

Opposite page: Despite the Riverina being drought-affected, the saltbush planted on a previously useless saline-affected paddock is producing extremely valuable green feed for lambing ewes on Graeme Hibbard's property.

considerable savings by putting the sheep in the saltbush paddock instead of buying hay or grains to supplement their feed.

During the shearing season, the saltbush paddock also provides shelter for the newly shorn sheep. Because the sheep are generally feeding higher off the ground, and not grazing in their own manure, the saltbush has also helped cut down on potential worm problems, despite the high stocking rate.

This year we bought 550 drought-stricken ewes. We were able to buy the stock when the prices were low because we knew we had the saltbush in reserve to feed them. The sheep were pretty crook from all the travel but the saltbush seemed to revive them overnight.

Economically, the saltbush has been very important for us. Before planting saltbush, we had a crop of wheat in the paddock and 15 out of the 30 ha planted wasn't even worth harvesting. Now the whole area is productive.

The saltbush has let us change an unproductive bit of land to good grazing country and has also helped lower the water table.

I think the cost of sowing saltbush can put people off, but we probably recouped our expenses within two years and we are even thinking about planting more saltbush in areas not affected by salinity.

• *Graeme Hibbard spoke with Lisa Gray, NDSP Communication Co-ordinator (NSW)*

Key points

- Saltbush as a supplementary feed shows many economic and environmental benefits.
- Saltbush has a valuable role in managing salinity.
- If looked after properly, saltbush will provide a valuable grazing resource for the long term.

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When a farmer worries of a salt problem

Case study: Grant and Catherine Arbuckle, 'Aurifer Downs'
Location: Bungunya, southern Queensland
Property size: 4420 ha
Rainfall average: 575 mm
Soil types: Brigalow Beulah
Enterprise: Mixed farming, grazing



Grant and Catherine Arbuckle and family inspect a crop of chickpeas in country identified as low salinity hazard.

When southern Queensland farmer Grant Arbuckle first noticed a white deposit crusting the surface of his soils after heavy rain events, he started to worry that salinity had reared its ugly head on his property.

His soils were waterlogged after heavy rain events, and he thought his water table might be rising to the surface.

"I was still clearing my country," he recalls. "I knew I was not in a Victorian-type situation, where there's very bad salinity, and they have to go back and revegetate."

"But I had no clear recommendations of what to do and what not to do with the timbered land that was left, and how to develop the rest of my property. And I was very worried when I noticed the white deposits and the wet soils in my good farming country."

Grant's problem was, in essence, not knowing whether he actually had a problem.

"All farmers want to do the right thing. I believe most of us are just looking for good advice."

Under the National Heritage Trust-funded project, Managing Dryland Salinity in the Queensland Murray Darling Basin, Grant was able to access the services of senior Department of Natural Resources and Mines (NR&M) land resources officer, Ian Heiner, who thoroughly inspected his property.

"Ian was great. He crawled all over the property and was able to answer most of my questions."

The outcome?

"I was assured I had a low risk of salinity occurring because of my soil types, and current land use practices, including water use and monitoring, are as efficient as possible. My cropping systems are as water



efficient as possible,” he says.

The white crust was more likely to be mould than salt crystals.

However he was surprised to learn that his melon hole country (see caption) – which he had on a three-year crop rotation, had a higher risk of a salinity problem, due to the geological features of the landscape.

“I was looking at higher ridge country and leaving trees there, but not aware at all that the better melon hole country needed attention.”

Ian recommended he look into planting improved pastures and grasses there to avoid salinity.

As a result of the inspection, Grant was assured he had no need to change his cropping practices on his good country. He has stopped his three-year rotating fodder crop program on the melon hole country and will (when the seasons improve) replace it with permanent pastures such as buffel and bambatsi grass.

The whole experience was a revelation.

“The salinity debate has so strongly centred on trees, but I now know that in some parts of my property I have other options, and I can achieve as much with long-term grass-dominated pastures as with trees in these areas. That’s big knowledge.”

Ian Heiner agrees, adding that the first step must always be an understanding of your own landscape, as there can be consequences for other landholders, with salinity a bigger issue than just individual properties.

“One of the advantages of Grant’s situation is that he has been keeping accurate records of salinity levels in his cropping soils.

“It’s always important to monitor, so that potential problems can be picked up early,” he says.

Grant’s advice to others in a similar situation? “Get the information. Get the science,” Grant urges.

“It would have been hard to get information on my place. I wouldn’t have paid (a consultant) for it because I didn’t actually have a problem - just a potential one. I have all these other priorities - not least of which is drought.”

He believes there is no substitute for extension programs. He says farmers need grass-roots hands-on scientific advice about their own properties so they can effectively plan how to do the right thing to avoid any salinity problem for them and their neighbours. Not knowing the answers means you only are operating intuitively. Good, old-fashioned extension programs really do work extremely well.

Grant acknowledges the help received under the National Dryland Salinity program, funded by the National Heritage Trust. Project partners in Queensland are the Queensland Murray Darling Committee, Conservation Farmers and the Department of Natural Resources and Mines. As part of the project, Landcare officers, consultants and agency staff have been trained in salinity awareness.

- Grant and Catherine Arbuckle spoke with Susan Cullinan, Queensland Conservation Farmers Inc

Above: Stock is part of a rotation system, seen here grazing skip row sorghum stubble.

Below: Water running down cracks is a likely cause of ‘melon holes’ on ‘Aurifer Downs’, creating a higher salinity risk. Improved perennial pastures and grasses are gradually being established on this country to lower the risk.



Key points

- Identifying landscape ‘hazards’ reduce salinity risk
- Monitoring water use efficiency a priority for farmers
- Pasture grasses offer productive management option

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'Wild Games in the West' a new approach to salinity education

A day of games has provided a new approach to salinity education in Victoria's Wimmera region. The games were created with a local focus and took children outdoors to role-play and actually see how to solve environmental problems.

The initiative began when local Landcare Facilitator, Elisia Dowling and Salinity Extension officer, Rachel Farran noticed a lack of environmental awareness in the children of the region.

After talking to children in Grades Five and Six, Rachel approached Elisia about conducting a school program to teach children about environmental issues including waste management, pest plant and animals, salinity and Landcare.

"When we approached the schools the teachers were thrilled with the idea," Rachel said.



Photo: Jo Curkpatrick

A day of games adds fun to salinity education in western Victoria.

"I searched high and low, but found that most salinity education games were about irrigation salinity. As I work in an area affected by dryland salinity I had to adapt these games and create new ones to teach about salinity."

"We wanted all the games to have a local

focus on them, so we had to create our own games or adapt activities we found by searching the web or looking in activity books," said Elisia.

The focus of the games was on the benefits of trees and their role in managing salinity and brought environmental and youth organisations in the West Wimmera together, including the Desert Fringe Regional Waste Management Group, the West Wimmera Shire and Department of Primary Industries Officers.

The organisers hope that applying for funding will allow for a more permanent program to be established.

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New \$10,000 prize for grains research

Research that improves the environmental sustainability of growing introduced grains is a new focus for the Australian Museum Eureka Prizes, Australia's premier and most comprehensive national science awards.

The Australian Museum Eureka Prizes reward outstanding Australian science and raise the profile of science in the community. A record line-up of 21 prizes worth \$210,000 are on offer in 2003, in the fields of education, industry and innovation, research and science communication.

The Grains Research and Development Corporation (GRDC) is this year sponsoring a new \$10,000 Eureka prize. This new prize will be awarded to an individual, team or organisation for innovative grains research that has, or could result in, increased sustainability of the use of natural resources such as soil, species or ecosystems.

Entries in Eureka Prizes are encouraged from researchers, although candidates can also be nominated by others. Other prizes on offer in 2003

include \$10,000 awards for biodiversity research, for environmental research and for outstanding interdisciplinary scientific research.

Further information on the new 2003 GRDC Eureka Prize for Research to Improve the Environmental Sustainability of Graingrowing, and other 2003 Eureka Prizes, is available from the Australian Museum's website at www.amonline.net.au/eureka or eureka@austmus.gov.au.

• Entries close Friday 16 May 2003.

Revolution needed to counter salinity

A 'revolution in Australian agriculture' is needed to deal with current and likely salinisation of land and other natural resources, according to Professor Phil Cocks.

This, he says, will involve profound changes in land use, farming systems and the lifestyles of farming communities, and will require the development of new industries and support from government.

Professor Cocks, chief executive officer of the CRC for Plant-based Management of Dryland Salinity, said the establishment of perennial plants was the major component of the reforms needed.

He said these perennials, which used significantly more water than annual crops, together with the selective use of deep drains, the pumping of ground water, and better management of surface water, were needed to counter salinity.

Professor Cocks said 5.6 million ha of land had succumbed to salinity and estimates were for this to increase six-fold. The underlying cause of this was the past clearance of native vegetation that previously had used rainfall and kept water tables from rising.

In the WA wheatbelt about 90 per cent of the perennial vegetation had been removed and this figure might well be higher in the wheatbelt of south-eastern Australia. It was not only agricultural land that was affected by the resultant salinity, but also rivers, wetlands, roads and urban infrastructure.

Professor Cocks said improved management of farming systems based on annual crops and pastures was occurring but did little to reduce leakage (of rain) into groundwater.

"There seems little doubt we must work towards farming systems based on perennial plants but these do not mean the end of cropping," he said.

"Alley farming with cereals, phase farming with cereals and lucerne or other perennial plants, companion cropping with herbaceous perennials and crops growing together, and mixtures of all three, are all possible.



"Agricultural systems will continue to produce conventional products. What will be different is that the quality will rise, farming systems will become more diverse and stable, and there will be a raft of new products."

Professor Cocks said for perennial plants to be adopted however, they needed to be able to compete economically with annuals, otherwise farmers would not use them.

Consequently more R&D was needed to extend the range of perennial pasture plants which were available and attractive to farmers and to find ways of integrating them into farming systems.

As well more work was needed on the sustainable use of saline land and the future role of woody perennials such as oil mallees and some acacias, for which there were potential markets for their products.

Professor Cocks said that for these markets to be realised, investment in local infrastructure had to occur.

"It is interesting to reflect on the scale of government investments to establish the large agricultural industries that exist today," he said. "Not only were roads built but an astonishing network of railways penetrated almost every part of the countryside.

"I argue that a much smaller investment in small generating and processing plants will develop the perennially-based farming systems that are necessary to manage salinity and make our farming systems sustainable."

CONTACT:

www.crcsalinity.com

Tell your story in SALT...

Australia's National Dryland Salinity Program (NDSP) is a partnership in research, development and extension tackling the salinity risk to Australia's land and water resources. Every success story in the battle against salinity should be told - your experiences and solutions might help others. Do you have a story to tell about your experiences in tackling salinity? If so, SALT magazine wants to help you share it. Contact your nearest NDSP Communication Co-ordinator:

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For further information about Australia's National Dryland Salinity Program, visit our web-site on-line at www.ndsp.gov.au

salt

The Magazine of Australia's National Dryland Salinity Program

"We look to see what's eaten first and it's always river saltbush...in the wet years we don't use it, but it's like a bank. It's there when you need it in dry years – a reserve that you have to have."

Buster Dawes, wool and grain producer, WA
(see story page 8)

"All farmers want to do the right thing. I believe most of us are just looking for good advice...the salinity debate has so strongly centred on trees, but now I know that in some parts of my property I have other options, and I can achieve as much with long-term, grass-dominated pastures as with trees in these areas. That's big knowledge."

Grant Arbuckle, grazier, Central Queensland
(see story page 20)

SALT Magazine brings you success stories from people tackling dryland salinity on their land or in their area. Dryland salinity has emerged as a major threat to the long-term sustainability and profitability of Australian agriculture and is increasingly impacting on infrastructure in urban and regional areas. However, success in managing salinity is being achieved across Australia, through a variety of means.

Australia's National Dryland Salinity Program (NDSP) is a partnership in research, development and extension tackling the salinity risk to Australia's land and water resources. NDSP regularly publishes SALT Magazine to share personal stories of success in managing dryland salinity in a straightforward style.

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