



CRC FOR
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MANAGEMENT
OF DRYLAND
SALINITY



Salinity Update WA

September 2005

Most people know that Western Australia lays claim to about two-thirds of the country's salt-affected land, but how bad is it really? With publication of the salinity theme of the National Land & Water Resources Audit in 2001, based on water table levels and their projected movements, it was possible to believe that over the next 50 years large proportions of some wheatbelt shires could become almost uninhabitable due to spreading salt. Estimates were that 1.8 million hectares or 16% of the agricultural areas then had water tables within 2 m of the surface and stable or 2-5 m and rising, and therefore had a high risk of salinity. This area was increasing at about 75,000 ha annually and likely to expand to 4.4 million hectares or a third of agricultural areas by 2050. Since then Land Monitor satellite mapping and ground-truthing have indicated that about a million hectares are currently affected by salinity with an annual increase of about 14,000 ha/yr.

While considering the different systems is like comparing apples with oranges, and the numbers are still alarming, increased research is showing different ways to maintain productivity and profit in saline environments. Buying time, especially after several dry seasons which have caused groundwater to fall in many areas, is now much more feasible. Some ideas on how this might be done are touched on below.

EverGraze, a new farming system that combines perennial pastures and more intensive livestock production to boost farmer profits was launched in August (see story in *Focus on Salt* page 2). Its first WA target is the Albany Eastern Hinterland where both severe wind erosion and waterlogging are frequent threats, and much of the catchment is at risk from salinity. SCRIPT (the South Coast Regional Initiative Planning Team), and the Albany Eastern Hinterland Catchment Group are working with Paul Sanford and a Department of Agriculture team. It is hoped to extend to other high rainfall catchments as the project develops. Wellstead producer Steven Hall has been using perennial pastures for fine wool

and meat production for about five years. He is enthusiastic about the value of kikuyu, Rhodes grass and signal grass, which are stabilising the landscape. At the same time, the perennials have overcome the need for supplementary feeding and improved wool quality.

➤ *Paul Sanford, Department of Agriculture, Albany on (08) 9892 8475*

Seeking superior saltbush. Being palatable to grazing animals can often be a plant's worst enemy in the evolutionary survival race, so it's logical that many of the strains of saltbush thriving in WA are probably the ones that sheep and kangaroos have passed over when seeking a tasty snack. Until recently, although plant breeders have spent much major time and effort in trying to improve various crop and pasture plants, saltbush (like Cinderella) was forgotten. This is set to change following a meeting in Perth in late August, organised by the CRC Salinity.

Scoping of a new research project has begun and over the next year several hundred specimens of old man saltbush will be collected from both WA and Eastern States in a wide range of habitats to assess factors such as palatability and digestibility. Old man saltbush (*Atriplex nummularia*) has been chosen because the species is important on many soil types across Australia, both salt-affected land and recharge areas for non-saline land.

Mike Ewing from the CRC said seed samples would be grown out and then screened to find the most useful lines. Initial work has shown a lot of natural variation, variation which is a prerequisite of plant improvement efforts and he is hopeful that some very palatable lines will be found, perhaps in the rangelands, away from water sources and therefore less likely to have been eaten out by stock. Such lines could then be screened for key characteristics and tested in the target environments prior to being bulked up and made available to land managers. A range of types is needed especially if the main purpose of a saltbush stand is to pump water tables, not

just be part of a stock smorgasbord. Hopefully the first round of selection of superior plants could happen in 2007 for recharge areas, and possibly later for saltland. Early work is indicating that there is not necessarily a close association between palatability and feed quality, so the last plants grazed in a stand might still play a useful role even if fussy sheep reckon they taste more like Brussels sprouts than icecream.

- *Mike Ewing on (08) 6488 2856 or mewing@cyllene.uwa.edu.au*

Marriage of convenience? Combining cropping with livestock in the medium rainfall zone makes sense on many fronts, an audience of farmers and scientists concluded in Perth recently. A forum on maintaining crop profitability while lifting animal performance on mixed farms, organised by the CRC Salinity and CLIMA, heard many arguments for retaining stock in the interests of overall farm system efficiency. But many accepted that running sheep was not a turn-on for some younger farmers.

Mike Ewing from the CRC noted a huge dynamism in the mixed farming region where profit was the main driver, but sustainability was also important. Terms of trade were declining but higher productivity through innovation was the key to remaining profitable, he suggested. MIDAS computer modelling indicates that cropping about 70-80 per cent of a farm in the 350 mm rainfall area is most profitable, but even 60-85% crop makes little difference to overall returns. By contrast, in the 600 mm rainfall area of the Great Southern, most profit is obtained at little or no cropping, but there's a strong case for having up to 30% of the farm in crop.

Small areas of saltland pastures such as saltbush had potential to lift overall returns by providing a 'standing haystack'. This allowed opportunity to boost profit and increase intensity of cropping in parts of the farm most suited to this activity.

Mick McGinniss, who farms 4,500 ha in the 325 mm annual rainfall zone near Merredin, suggested that to be successful, you had to know your business, where the money was being spent and where it was being wasted. He suggested that farmers would be pushed (not pulled) back into sheep by higher energy costs and herbicide resistance.

- *View forum summary at <http://www.clima.uwa.edu.au/publications>*

Spare a thought for trees. Increasing salinity could be playing a minor part in the decline of major WA native tree species, it is now appearing. Researchers at the University of Western Australia's School of Plant Biology are concerned by deaths and health decline among banksias, jarrah, tuart and wandoo. Initial research is pointing to climate change and reduced availability of water as the main culprit across the species, but salinity could be the cause of some wandoo crown decline. Seed has been collected from 30 provenances to explore differences and mildly saline growth solutions are proving to reduce growth severely.

- *Eric Veneklaas on (08) 6488 1080 or evenekla@cyllene.uwa.edu.au*

Palatable, perennial and productive – that is the prescription for the native plants being sought by the CRC Salinity in WA to widen farmers' pasture options. Add the characteristics of tolerance to both drought and acid soils (lacking in current perennial pasture recommendations such as lucerne) and it becomes a very specialised quest. CRC Research Officer Richard Bennett is planning a field trip in October to the Goldfields and Murchison seeking likely candidates. Because wheatbelt areas are extensively cleared, they are less likely to be found there, although some may be thriving in local reserves or other pockets. And once located, the next stage is to grow out seed and begin testing for suitability. If anyone has experience of native plants that could become potential pasture components, the CRC would love to hear about them.

- *Richard Bennett on (08) 6488 1936 or bennettr@cyllene.uwa.edu.au*

Spreading the eggs between several baskets seems to be the way to farm profit, if you believe the computer modellers. Former CRC Salinity postgraduate student Michele John, now working with CSIRO on the Catchment Demonstration Initiative in the Wallatin-O'Brien Catchment near Kellerberrin, used MUDAS (Model of an Uncertain Dryland Agricultural System) to study options in the eastern wheatbelt. She found that of three conventional tools to manage salinity – saltland pastures, lucerne and oil mallees – a bit of all three was the best way to go.

MUDAS indicated that with none of these options, typical farm profit (based on cropping and livestock) would be around \$198,000 per year. It rose slightly when two of the options were used on 4-8% of the farm, reaching nearly \$212,000

with all three in place. This 4-6% profit increase was attributed to higher yielding perennial pasture systems, provision of feed at different times, and inclusion of a profitable woody perennial on low profit soil. Optimum areas varied slightly depending on soil type but were generally 4-8% of the farm without encroaching salinity, reaching 10% with encroaching salinity. To gain profit improvements required an increasing focus on pasture and livestock management, a more ewe-dominant flock, increased supplementary feeding and increased livestock selling and agistment.

Prospects for saltland pastures and deep drains were also modelled. Michele concluded that saltland pastures (belts) provided an economic return on *moderately* saline land. But the profitability of deep open drains depended on drainage efficiency, cost of construction and maintenance, and effectiveness in remediation. She suggested that effective drainage to 100 m from a drain is the breakeven point.

➤ Michele John on mjohn@cylle.uwa.edu.au

Everyone affected by salinity believes they have a priority case for funding handouts, so a few years ago, a Salinity Investment Framework was devised to provide a more strategic approach to funding. Recently the Department of Agriculture published an analysis for agricultural land and infrastructure assets, as Resource Management Technical Report 270. Results showed that 0.82 of 1.05 million hectares of salt-affected land was owned privately, but a much larger area (between 2.9 and 4.4m ha) was assessed to have a salinity hazard. Under current salinity management practices and adoption patterns it was estimated that 415,000 ha was able to be recovered, 445,000 ha could be contained and 750,000 ha would need to be actively managed in a saline condition (adaptation). Investment in recovery and containment was regarded as having the greatest benefit. The publication divides agricultural areas into soil-landscape zones and provides estimates of urgency, technical feasibility, probability of adoption ratings and gross benefits of treatments within zones so could be useful for catchment managers at varying levels.

➤ Search on <http://www.agric.wa.gov.au>

Bower bird opportunity. Just over 12 months ago, as its finale to a decade of research, the National Dryland Salinity Program published three directories of salinity management information for separate audiences - policy makers, catchment planners and leading producers/advisors

- indicating the state of knowledge and where to seek more information. A year on, accumulated knowledge is moving forward steadily, but the directories still provide the best available summary of who has done what, and where to find out more. The Department of Agriculture in WA still has some copies of the directories for catchment managers and leading producers, so if you fancy a copy (they are free) and have some unfilled bookshelf, some are still available, plus a few copies of an all-encompassing CD.

➤ Contact Georgina Wilson at gwilson@agric.wa.gov.au

Rural Towns – Liquid Assets, the Department of Agriculture-led project involving many government agencies, universities, CSIRO and local shires, recently signed up its sixteenth and final town, Brookton. Over its remaining two years, water management plans will be prepared for each town, aiming where possible to convert under-used groundwater or surface water into something useful and reduce reliance on expensive piped scheme water. Investigations are showing that large volumes of surface water from winter rains often go to waste, while creating temporary flooding problems, but could be captured for use in watering parks, ovals and other areas. Plans are afoot in Dowerin for example to build two new dams to take advantage of this unused resource — a small dam at the bottom of the slope near the showgrounds, from which water is then pumped up to a larger storage dam. In Wagin, a production bore from beneath the town will be commissioned shortly. This water is about a quarter as salty as seawater, so when mixed with fresh water has potential to supply the town's irrigation needs. The extra source of water should help relieve the shire and its ratepayers of a sizable water bill each year.

➤ Contact Mark Pridham, Department of Agriculture on (08) 9368 3919

SEA News #19 is available on the web. See the full newsletter and articles at <http://www1.crcsalinity.com.au/newsletter/sea/SEANews19.html>

This issue includes three articles:

- SIF3: An investment framework for managing dryland salinity in Australia;
- Targeting perennials to balance profit, water yields and salt loads; and
- Research issues for future agriculture: an economists perspective.

About 60 hardy souls braved cold winds near Yealering in late August to attend the Sustainable Grazing on Saline Lands (SGSL) research field day. Chris Walton's property looked great, especially compared with photographs from a year earlier, but that partly reflected the good season as well as on-going salt treatments. In some areas mixed pasture of balansa, Persian clover and other annual clovers and medics was almost smothering saltbush plants. Pasture seed was sown at 9 kg/ha, which the researchers felt was a reasonably economic level – not 60 kg as some people have tried! No grasses were included in the mix as controlling barley grass, the main volunteer pasture on this land, is a high priority. At the time of the field day an unmodified barley grass plot contained 1.3 t/ha of barley grass compared with the modified plot of about 5.5 t/ha of understorey and 250 kg/ha of 'edible' saltbush. The plots are being monitored closely and will be grazed later.

➤ Contact Hayley Norman (08) 9333 6636 or hayley.norman@csiro.au

This short newsletter has been mailed out with *Focus on Salt* to subscribers in Western Australia for the last few editions, since publication of *Focus* was taken over by the CRC Salinity. While prepared by the CRC, it aims to provide items to the wider community that is interested in better management of dryland salinity. However, this September Salinity Update is the final hard-copy edition. Henceforth it will only be available as a PDF on the CRC's website www.crcsalinity.com. By going online we obviously save some money, but can also be more timely which we hope to be.

➤ Georgina Wilson on (08) 6488 7353 or gwilson@fnas.uwa.edu.au

Coming events

International Workshop

9th International Conference on Salt Lake Research

Curtin University of Technology, Perth
26-30 September 2005
<http://www.isslr.org/>

Lucerne Spring Field Day

9 am – noon, Wed 28 September
Farmers Robert, David and Glen Beard
Contact Soheila Mokhtaril: 9821 3251 Mob:
0428 133 410

Combined SGSL and SPA farm walk

Bundilla, Lake Grace
Thur 29 Sept, 10am – 12.30 pm
RSVP to Sally Phean (0427 902 126)

Inaugural WA State Conference on Natural Resources Management

Denmark Centre for Sustainable Living
4-6 October 2005
mdurcan@iinet.net.au or www.wanrmconf2005.org

SGSL Farmer and Researcher Forum

Broadway Function and Arts Centre,
Bassendean
Friday 21 October
Contact Justin Hardy on (08) 9892 8408.

CRC Salinity Communications - www.crcsalinity.com

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