

# fact sheet

Land Soils and Agriculture



## Salinity and Sustainable Land Management

### Case Study No 5 – Double D

<b>Landholder</b>	Dan Moran
<b>Location</b>	South of Mount Coolon
<b>Rainfall</b>	545 mm
<b>Property size</b>	10,660 ha
<b>Enterprises</b>	Cattle

Double-D is fairly typical of grazing properties in Brigalow-Blackwood country between Mount Coolon and Moranbah.

#### Double D

Double D is a cattle operation that targets several key markets. Dan and his family mostly produce cooler climate cattle, rather than the Bos indicus type typically of region. Most of Dan's bullocks are sold onto the EU market. However, Dan noted, "We sell some as store cattle, including some heifers. If the years are a bit lean on, we'll sell them as stores, and if we've got a good season, we'll sell them through as local trade."

#### The Brigalow Development Scheme

Dan drew the block that became Double D in the Brigalow Development Scheme in 1973. At that time it was completely undeveloped.

Under terms and conditions of the scheme, all of the property had to be developed: which essentially meant that it had to be cleared. In hindsight, this policy had some limitations.

"They didn't make any recommendations for keeping shade lines, which was a mistake at that time, because some landholders just cleared everything. We've since learnt that leaving good shade lines and good corridors is an absolute must in this country," Dan said.

In the last block that he cleared, Dan left 100m wide strips of trees every 500m.

"That's made a huge difference. That's one of our best-grazed paddocks," Dan said. Dan Moran is encouraging the native grasses back into his pastures to increase the availability of feed.



R Preston 2006

#### Diverse country has it's challenges

The bulk of Double D is Brigalow-Blackwood country. There are also rosewood ridges throughout the property, gidgee, open box flats and broad-leaved ironbark, and some spinifex country.

This diversity of land types and soils creates many challenges for Dan as he seeks to match stock numbers and grazing pressure with feed availability and pasture condition.

"We end up with a quite a few areas in a paddock that don't get grazed at all, because cattle don't bother to go and graze non-palatable grasses," Dan said.

#### Problems in melonhole country

The melon-hole country on Double D has some particular challenges.

"We're seeing the cattle flog the tops of the mounds and they only leave the ring of grass at the bottom. That ring of grass has been getting smaller and smaller.

When we get a good wet season the grass starts growing down in the hole, but it then drowns, so we're only left with a ring of grass," Dan said.



One part of the solution to maintain better grass cover, particularly on the mounds, is a move towards rotational grazing.

"It's been definitely proved to me beyond doubt, that rotational grazing does make the difference. But we'll have to do light stocking with rotational grazing, and then steadily increase our stocking as we get our country up," he said.

### Native grasses on the come-back

Dan has noticed that the native grasses are adapting to conditions in melon-hole country better than some of the introduced species. "Buffel has been the main variety we've planted in the past, but we're now starting to see that some of our native grasses are making a come back."

The most prolific of the native grasses are Barley Mitchell and the Hoop Mitchell. "The old Bull Mitchell's there, always has been, but it's getting a lot thicker too," said Dan.

"I'm very hopeful with the way that Hoop and Barley Mitchell are coming back. Everywhere I go I see cattle grazing the native grasses, and Eurochloa standing beside it that they haven't touched."

Spelling gives the seedlings time to re-establish and get going before you put stock in. "And with the native grasses, we need a longer spelling time for them to establish properly," Dan said.

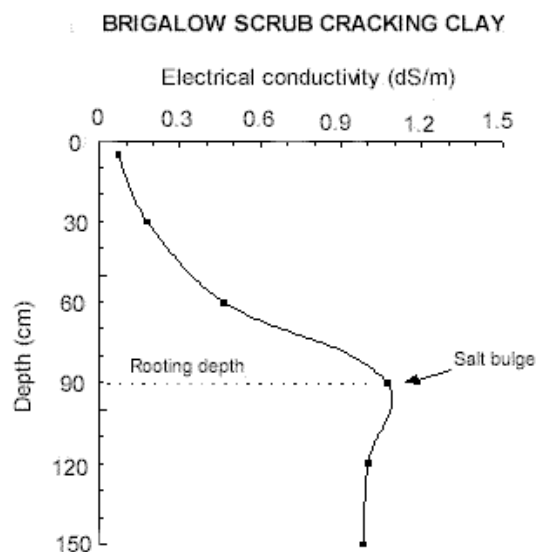


Dan is finding that native grasses, especially Barley Mitchell and Hoop Mitchell, are starting to do better than improved pasture species in parts of his melon-hole country. They take a while to germinate and establish, so they need longer spelling times to get properly established.

### Is this dryland salinity?

Many of the soils at Double-D have naturally high salt levels that causes problems for pasture growth and persistence under grazing.

There does not appear to be an immediate threat of dryland salinity associated with rising groundwater though. The landscape is predisposed to developing salinity, due to the high salt loads. However the risk of salinity is generally low, with water tables being very deep, if present at all.



<http://www2.dpi.qld.gov.au/fieldcrops/3163.html>

The graph shows a salt bulge that is typical under Brigalow and Blackwood. Soil salinity becomes a problem when the salt bulge occurs higher in the soil profile and limits root development or when soils are salty at the surface (e.g. on the top of gilgai mounds) and do provide unfavourable conditions for pasture seed germination.

### Working with Blackwood-Brigalow country

There is country in the Mount Coolon district that has saline, sodic conditions close to the surface. This includes Blackwood country on Regional Ecosystem RE 11.4.5 which is confined almost entirely to relatively low-lying, gilgaied clay plains on which particularly saline, sodic soils have developed. The Pegunny, Rolleston, Warwick and Turon soils have severe limitations to plant establishment and growth.

While the soils are quite deep, salt acts as a barrier to root growth. Salinity levels (measured as electrical conductivity 1:5 soil water) greater than 0.8 dS/cm, stop most plants' root development. Soils in Blackwood-Brigalow country often have salinity as high as 2.4 dS/m at 30 cm, rising to 7.4 dS/m at 150 cm.

High soil chloride concentrations and difficult surface physical characteristics (e.g. crusting, self-mulching, hard setting) also make it difficult for grass seeds to germinate and for young seedlings to become established.

Dan has found that exotic grasses such as Buffel are not as well adapted to these difficult soil conditions as native species. Unfortunately, although the natives are well adapted to the harsh conditions provided by these soils, they never grow great bulk and do not provide the same level of feed as exotic grasses on better soils.



Pulling suckers in two directions helps to improve distribution of organic matter across the melon-holes. This helps with infiltration of water and provides a better seed-bed for germination.

## Key Points

- The melon-hole soils in Brigalow-Blackwood country are experiencing declining productivity due to the characteristics of the soils and management.
- The most pressing problems concern the re-establishment of pastures on melon-hole soils and a gradual loss of productivity with conventional improved pastures. In many cases the problem is associated with sodicity and/or soil salinity.
- While the soils are very salty there is no immediate dryland salinity risk here, as the salinity is not associated with rising or elevated groundwater.
- The high level of salinity hazard in these landscapes means that there may remain a long-term risk of salinity that should be actively managed. Clearing in this country has probably increased water infiltration and could result in groundwater coming to the surface in the very long term.
- Rotational grazing and wet season spelling, which favour perennial grasses and help to increase pasture diversity, assist in maintaining ground cover across the whole paddock and improve productivity.

The BDTNRM Dryland Salinity Project was funded by the Australian and Queensland Government as part of the National Action Plan for Salinity and Water Quality. The final report is available at BDTNRMs website or contact BDTNRM for further information.