# Maximising water use to solve dryland salinity – a producer's story

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**Abstract.** The Widdis' family property "Boondari" lies at the base of the Liverpool Ranges in North-West NSW. Soils on the property are rich and fertile, but a few small areas are affected by salinity. This paper outlines how salinity was discovered and the systems that have been introduced, such as perennial pastures and response cropping, to maximise water use and help lower the water table.

## Introduction

"Boondari" is a 1700 ha property which lies at the base of the Liverpool Ranges in North-West NSW. Soils on the property are rich and fertile. About 60% of the property is plains (cracking clays) and 40% slopes (basalt origin). We have had the property since the 1950s and started cropping the plains in the early 1960s, with the slopes remaining uncropped, being predominantly plains grass to this day.

We live on a flood plain and suffer from large amounts of runon during times of flood, and consequently, waterlogging. Originally the Liverpool Plains were covered in native perennial pastures. The soils are derived from volcanic basalts and naturally contain salt. They are also highly productive and around the 1950s-1960s, the area was converted from grazing to cropping. Now <15% of the original vegetation remains. This change from a perennial to annual plant system has upset the region's water balance in a potentially dangerous way. Cropping systems tend to use less water than deep-rooted perennial native grasses, so the heavy clays become saturated. Some water drains below the root zone and enters the groundwater. The constricted geology of the sub-catchment slows the flow of groundwater. The combined effects of deep drainage and the geology of the sub-catchment results in a rising of the water table and the mobilisation of salts.

## Identifying salinity on "Boondari"

About 10 years ago we noticed that yields were variable on a number of low lying areas. We initially thought that there were a few possible causes, including waterlogging, soil compaction or some type of chemical build up, but the areas were small so they did not worry us too much. Although the idea of salinity was bandied around, it was not a serious consideration until the neighbouring Landcare group also started talking about it. It was only when we saw a number of bare patches which were clearly visible on aerial photos that we realised how potentially serious it could be. So we decided to get an early start and prevent salinity from costing more in the long run.

An electromagnetic (EM) survey was conducted on the property by the Department of Infrastructure, Planning and Natural Resources (DIPNR) and we used maps and aerial photographs to help us work out what we needed to do. Low lying areas with high electrical conductivity (EC) were identified as high risk, taken out of cropping and put into pastures. We wanted to mimic the water use patterns of native vegetation and planted a mixture of phalaris, tall fescue, lucerne and salt tolerant clovers, but found it difficult to get anything to grow on the bare areas. Wrightson Seeds conducted some trials on a highly saline area and tall wheatgrass showed promise. I had also heard about puccinellia so we tried sowing a mix of tall wheatgrass and puccinellia. Puccinellia did not establish, so we concentrated on the fringe areas, planting them to tall wheatgrass. Over time, as tall wheatgrass has assisted lowering the water table and drying the soil profile, we've found that less salt tolerant species have moved into these areas.

Seven years ago we introduced a system of response cropping, which means we plant a crop as soon as we have enough soil moisture. In summer, we plant sorghum and sunflower. In winter, we plant wheat on the slopes and triticale and barley on the plains because they are more tolerant of waterlogging and salinity than wheat. Our trigger for sowing summer

and winter crops is 0.7 m and 0.5 m depths of wet soil respectively. This is less than what many people sow on (1 m and 0.85 m for summer and winter crops, respectively). This system works for us in most years – except when it is very dry.

## How effective have the changes been?

In the early 1990s we installed a network of piezometers (5 and 15 m deep) and began monitoring ground water and salinity levels. The ground water level fluctuates with seasonal variation in rainfall, but overall, it has definitely lowered. In dry years, the water table is about 2.2 m below the surface. In normal years it is 1.5-2.0 m. This is the critical depth at which saline water can be drawn up by capillary action. The level of salinity in the groundwater is slowly decreasing and the affected areas are getting smaller. When the piezometers were installed, EC levels were >10 dS/m in areas but had fallen to <2 dS/m by 2003. Anything over 2 dS/m is trouble for conventional agriculture.

Recently a series of soil pits were dug 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.

## Future plans

One of our neighbours has a property that has never been farmed. It is one of the few remaining areas of native grassland in the district. The diversity of perennial grasses is amazing. His farm is productive, the soils are healthy and there seems 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 sow about 200 ha of perennial pastures in the next 3 years. The mix (containing species such as lucerne, tall fescue, tall wheatgrass and a range of salt tolerant grasses) will be sown over areas ranging in slope and salinity so that everything can find its niche. We have planted a 6-row belt of mixed trees for about 3 km around the base of a hill to intercept water flow and increase biodiversity, and intend planting more. We also plan to fence riparian zones to limit access of these areas to cattle, except for periodical crash grazing to keep the grasses productive.

Most of the work conducted over the last few years has been encouraged by the Liverpool Plains Land Management Committee through their Land Management Tender.

## Conclusion

Salinity is a community and a catchment issue. It is important for everyone to do what they can to improve the situation. It is a gradual process. Some landholders are putting in trees while others are changing their land practices. The bottom line is to try and maximise water use and use it where it falls

We have lots of low lying areas on our property and need to do things differently to others higher in the catchment – that is why we are concentrating on our pastures and response cropping. There are many different options available. It is important to contact a Salinity Officer from the Salt Team and/or representatives from the newly formed Catchment Management Authority to obtain advice about options to solve a particular problem.

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