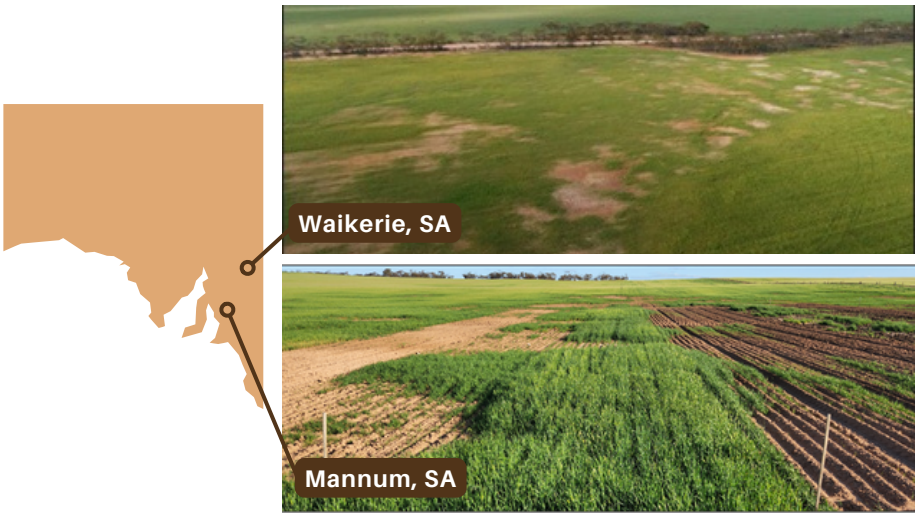
Opportunistic Sowing Into Dry Saline Land After Rain

Key messages

- Rainfall, especially winter rainfall, lowers topsoil salinity and is an opportunity to sow when conditions are more amenable for seed germination. Be ready to sow to take advantage when the opportunity arises.
- Soil salinity readings are often highest after very dry and hot February weather.
- Opportunistic sowing is more likely to be effective in low to moderate salinity areas as the rain can dilute salinity enough for seeds to germinate. In high salinity areas the patches can get smaller but the worst areas might still be too toxic for germination.
- Rainfall has less of an impact on deeper soil salinity than surface soil salinity.



Waiting until rain falls is one strategy growers can consider when establishing crops on dry saline land. In dry saline land, the top 5 cm of soil can become too saline for seeds to germinate. Rainfall just before seeding (ideally at least 20 mm) can flush salts from the surface, diluting soil salinity enough for crops to establish.

Taking advantage of this temporary drop in topsoil salinity can start paddocks on the path to rehabilitation by establishing soil cover. For example, in an autumn rain event at Wentworth, a scalded area shrank and, with subsequent cover, was brought back into production (see Case Study 'Sand and Straw Overcome Growing Dry Saline Patches near Wentworth').

Be prepared to sow as late as July in susceptible paddocks to maximise the rainfall effect. Soil salinity will rise again as the weather becomes drier and hotter. Many broadacre crops are affected when ECe>4, and only crops with a strong salinity tolerance will yield well when ECe>8 (Hughes 2020).

With dry saline land, establishing and maintaining soil cover is the goal. Waiting until rain to sow gives the crops a better chance of germinating. However, the amount of rain received is not guaranteed to lower salinity enough for germination. If sowing early, be prepared to go back and re-sow or broadcast seed on bad patches after rain, providing the patches are big enough or warrant the extra trip back into the paddock.

METHOD

The two South Australian examples in this case study show how soil salinity fluctuates in response to rainfall and the season. Soil samples were collected every two months from on patches of dry saline land. Both sites show salinity dropping in the top 5 cm of soil after decent rain and increasing again throughout summer.

At Mannum, the opportunity to sow was in June 2023 after 92 mm of rain dropped topsoil salinity on a bad scald from 2.1 dS/m (EC1:5) down to 1.3 dS/m (Figure 1). While this is still considered very saline (approximately 12.3 dS/m ECe), tolerant crops should cope. At the previous salinity level, a month earlier (2.1dS/m or 20 dS/m ECe) only saltbush would cope.

As winter remains relatively dry and the season heats up through to October, salinity levels from 0-5 cm rise again, up to 3.4 dS/m. After 75 mm of rain in the last week of November, soil salinity on 1 December had dropped back down to 0.92 dS/m. As the weather is hot at this time of year, the salts will quickly rise to the surface again. Applying a mulch, such as sand or straw, might be one strategy to make use of this lowered soil salinity without sowing a crop. Mulches will limit the salinity increase again over the summer. The impact of rainfall on soil salinity is more subtle from 5-30 cm depth (Figure 2).

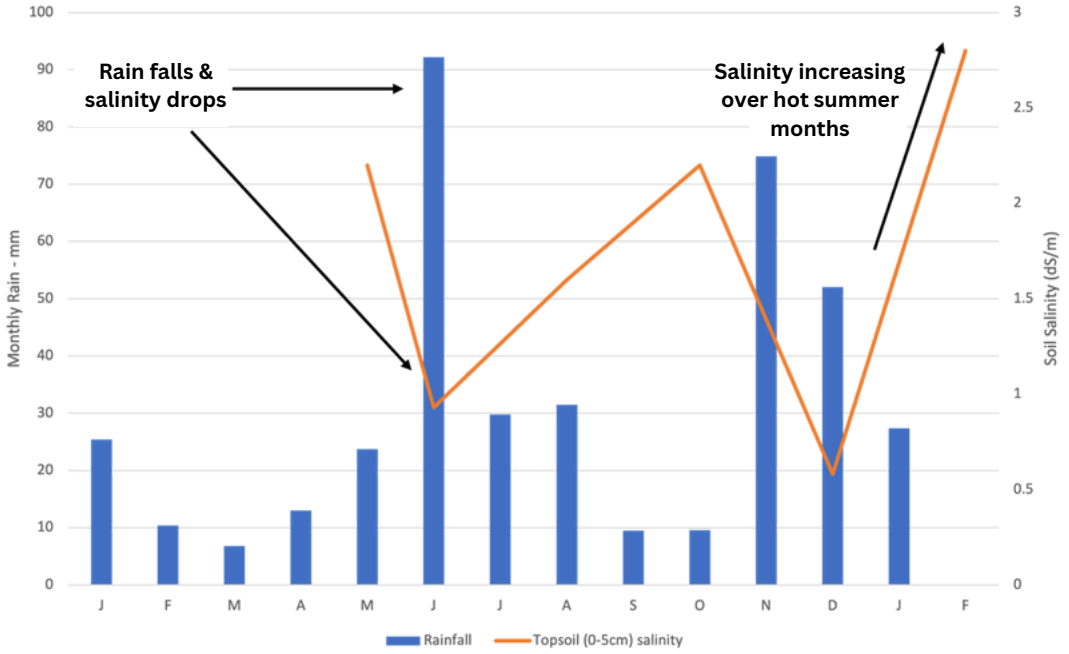


Figure 1. Rainfall impact on topsoil salinity (0-5 cm) in the bad scald.

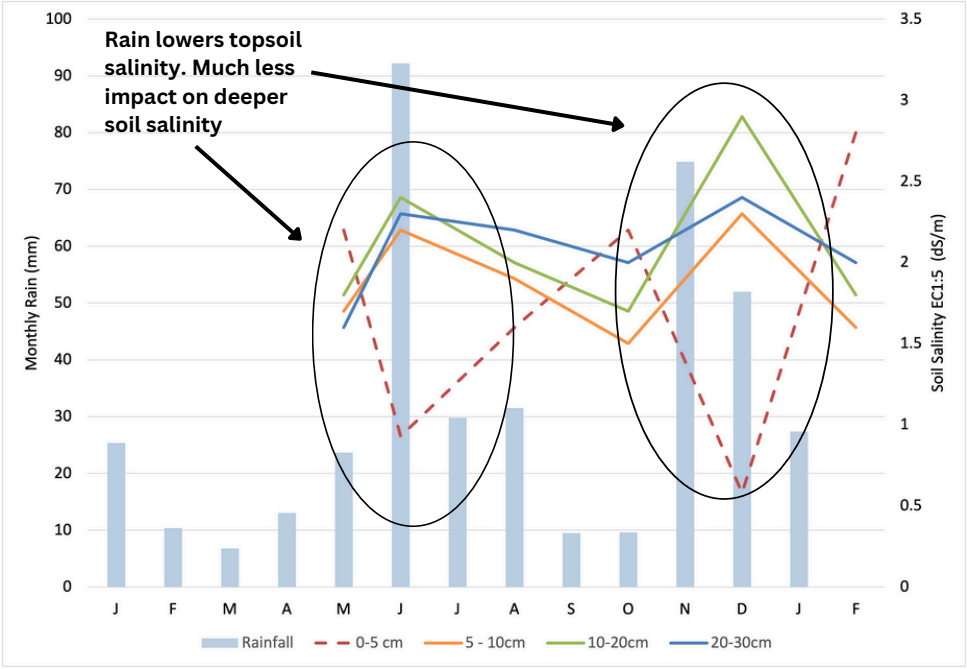


Figure 2. Soil salinity from 0-5 cm, 5-10 cm, 10-20 cm and 20-30 cm at Mannum

WAIKERIE

At Waikerie, just over 50 mm of rainfall in November lowered topsoil salinity to 1.5 dS/m, which then rose again throughout summer (Figure 3). This soil was lighter textured than the soil at Mannum, which is evident in slightly more impact on soil salinity levels from 5-10 cm.

In this case, April rainfall was timely for reducing salinity levels and providing an opportunity to sow.

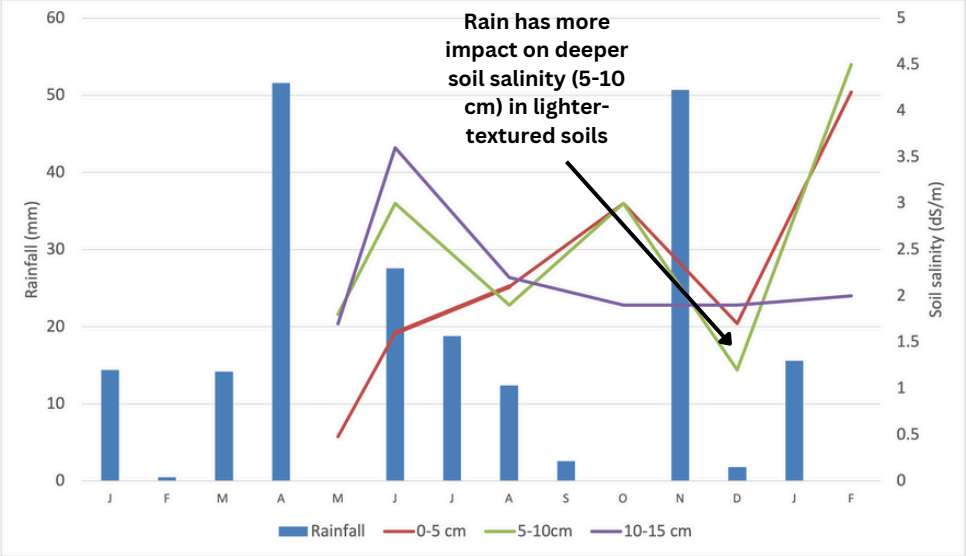


Figure 3. Rainfall vs soil salinity on a bad scald at Waikerie. Note the apparent decline in salinity from October to November is misleading. In reality, salinity levels likely decreased following the November rainfall. However, due to the absence of salinity data collection in November, this trend is not accurately represented in the graph.

MORE WORK NEEDED

Opportunistic sowing is a relatively new management approach for dry saline land. While the princple is showing promise, more work is needed to understand how best to use the approach.

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PROJECT INFORMATION

Soil data collected by Brian Hughes, PIRSA.

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