



# Making use of EM38 in the Mallee

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## Take Home Messages

- An EM survey conducted on a typical Mallee paddock has a high probability of effectively mapping soil characteristics that are important in determining yield potential and useful in developing zones for variable rate applications.
- The variation mapped at the time of the survey is likely to be based on relatively stable soil characteristics affecting plant available water across Mallee soils.
- Results from farmer field trials and longer-term modeling have shown fertiliser inputs and risk can be reduced and average paddock gross margins increased by zoning Mallee paddocks according to the potential yield responses of different soil types.
- With relative reliability and stability allowing for practical application on Mallee soils, the number of agronomists and service providers delivering EM-based variable rate agronomy services has increased; the costs of EM surveying has declined; and the area of cropping land EM surveyed is now over 150,000ha in the Victorian Mallee alone.

## Background

Increasing cropping intensity, rising fertiliser costs and greater recognition of the importance of salt-related chemical constraints in determining crop water use efficiency on Mallee soils has led to increased interest in variable rate fertiliser applications. Over the past three seasons, Mallee Sustainable Farming, in partnership with CSIRO and Mallee Focus, have conducted field testing of EM38 and run a number of farmer trial paddocks aimed at developing cost-effective ways to define zones for profitable variable rate applications. A main aim was to develop the practical application of EM38 as a tool to assist more cost-effective and lower-risk input use on Mallee soils. The GRDC-funded project has also used modeling to test the performance of variable rate N applications on the EM-based zones under a long-term range of season-types.

Electromagnetic (EM) mapping measures the apparent electrical conductivity of soil. It responds to a combination of soil water, salinity and texture in varying proportions. While it is always necessary to take soil cores to calibrate and validate EM38 measurements, EM38 mapping is particularly useful in the Mallee as it usually correlates well with important soil characteristics that are associated with crop yield potential such as common salt-related subsoil constraints that reduce plant available water. Knowledge of variable crop yield potential can then be used to inform decisions about variable rate fertilizer application.

