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Wind Erosion Control through growing more crops?

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The Issue

Wind erosion is an issue often associated with mallee farming practices across the project region. This often results in accusations that the land is not being managed in a sustainable way. Therefore, an **important** fact for mallee farmers to consider is that—it is **how** the land is farmed that causes erosion, not the fact that it is farmed.

Erosion must be managed both in the short term, based on seasonal variability, and in the longer term, focusing on development of a sustainable system. Currently, conventional district practice concentrates on two or three-year rotations that involve a fallow and or pasture phase. These conventional rotations are more likely to erode due to the pasture and fallow phase.

Growing more crops and pasture, in the right management system, offers better erosion protection than the conventional three-year rotation with conventional tillage.

What we know

Through the Mallee Sustainable Farming Inc. research and extension program, extensive monitoring of a range of farming systems has been undertaken to determine the risk of a paddock, or research plot, to wind erosion (Figure 1).

A summary of the key criteria found from this research includes:

- **Soil cover** (stubble, trash, crop, good pasture) is the best way of controlling erosion on sandy mallee soils.
- **Soil aggregation** (clods) can provide erosion protection on heavier textured soils (e.g. loam and clay loam).
- **Soil aggregation levels** are maximised where there is growing crop/pasture and tillage is minimised.
- **Rotations** with more crops (especially cereals) and pastures and less cultivation produce higher soil cover and aggregation levels and consequently lower erosion rates.

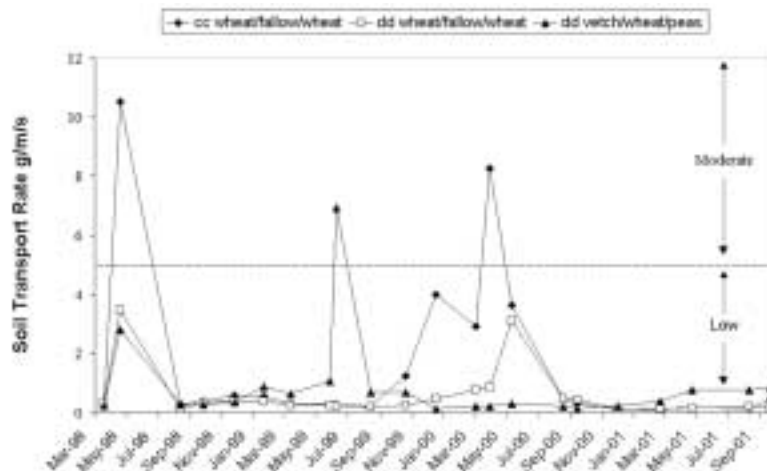
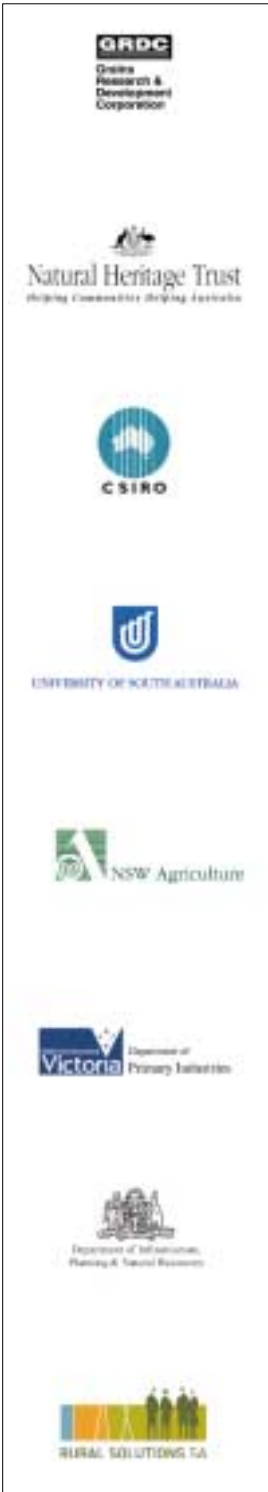


Figure 1. Calculated soil transport rates for three treatments on the New South Wales core site at Euston between March 1998 and September 2001. Conventional cultivation is indicated by cc, direct drill is indicated by dd in legend. Low and moderate relative erosion risk classes shown.



What this means

- That **wind erosion can be controlled** in the mallee if conservation farming rotations and cultural practices are used.
- That the old concept of **resting country** is not particularly helpful if that rest results in erosion either during the fallow or pasture phase—or before the next crop is grown.
- **Maximising cropping opportunities** and using the least number of cultivations necessary will minimise erosion risk (the first cultivation has the biggest effect on residue burial while subsequent cultivations quickly degrade soil aggregation).
- If cultivation is used, **low inversion** (e.g. blade ploughs and low profile sweep points), minimal disturbance (e.g. narrow sowing points) methods and **low operating speeds** will help maintain soil cover and aggregation.
- The more often there is plant growth and the **more vigorous this crop or pasture** is, the better it is for the soil and its erosion protection. Increased aggregation and ground cover are together providing protection against erosion (Figure 2).



Figure 2. Adequate cover and aggregation on the left, cultivated area on right with inadequate cover and aggregation.

Management actions to consider

There are a number of actions that can be taken to reduce wind erosion:

- **Minimising erosion** by increasing the number of high production crops, in terms of vegetative growth, grown in a rotation.
- **Minimising the number of cultivations** - consider herbicides for the job if conditions for good chemical weed kill arise (eg. low dust, after rain).
- **Maximising aggregation by using less aggressive cultivation equipment and/or lower operating speeds with wider row spacing**- consider equipment with more than 200 mm(9") row

spacing with edge on shanks and narrow low lift sweeps.

- **Using low disturbance narrow points at sowing.** Rotary harrows may help re-surface stubble residues in dry conditions, depending on previous burial depth, but can further increase aggregate breakdown. Disc seeders are the best way to minimise residue burial and disturbance at seeding. Also be aware that, in a direct drill situation increased stubble clumping due to poor residue handling with tine seeders, can leave significant areas of the seedbed uncovered.
- **Maintaining more than 50% soil cover**, of which half is anchored and on heavier soils, and maintaining aggregation levels more than 70% when soil is bare. (Note: an aggregate is a piece of soil greater than 0.85 mm or 1/32 of an inch in diameter)

What you can do

Consider doing your own monitoring? For soil cover, drive over a part of the paddock, then walk back along the wheel track noting how many times the tip of your boot touches some ground cover. Take 100 steps and if more than 50 steps have cover on the tip of your boot—then the paddock should not be at risk to wind erosion.

For soil aggregation, sieve about 2 kg of dry soil, from the top 2.5 cm of soil, through a fly screen. If more than half of the sample, by weight, goes through the screen and you have no soil cover, then your paddock could be at risk to wind erosion.



Figure 3. What can be achieved in the Mallee using the right tillage equipment in the correct manner - good aggregation level and some cover will protect this paddock

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