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NRM Plan

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Protecting soils from water erosion

In the Northern and Yorke NRM region

Nearly 30% of the Northern and Yorke region's cleared land is moderately to very highly susceptible to water erosion. This land occurs mainly on the slopes of the Southern Flinders, Northern Mount Lofty, Barunga and Hummock Ranges where sloping ground and erodible soil types make it prone to water erosion. Water erosion can also occur in other areas under conducive conditions.

Water erosion is costly in that it:

- Removes nutrients from the paddock;
- Reduces the volume of soil available to plant roots and its ability to store water, nutrients, and microbes that provide a range of biological services, ultimately reducing productivity;
- Causes off-site damage to other land, watercourses, roads, culverts, fences and buildings.



Above: Contour banks slow and move water safely across slopes.

Below: Overgrazing of paddocks will remove soil surface cover.



The loss of 1 mm of soil from 1 ha of land is around 14 tonnes of soil so it does not take much erosion to lose a significant amount of soil from the paddock.

The main agents of water erosion are raindrop impact and flowing water. A raindrop hitting the soil surface dislodges particles and moves them. The dislodged particles hit other particles dislodging them and so the movement process begins. Flowing water can pick up soil particles and carry them downstream.

The key principles for protecting soils from water erosion are:

- Cushion the soil surface from raindrop impact with a covering layer;
- Maintain soils in a well-aggregated or held-together condition so that individual particles cannot be easily dislodged or moved;
- Slow the speed of runoff so that it does not have sufficient energy to dislodge and transport soil particles.



Water erosion on a cultivated paddock.





Practices that help achieve these aims include:

- Stubble or residue retention. A vegetative canopy or layer, living or dead, will absorb the energy of a raindrop or dissipate it. The greater the surface area and the length of time the soil is covered by such a layer, the better the protection. Burning, heavy grazing and cultivation will remove or bury surface cover.
- Direct drill / No till / Zero till sowing practices minimise soil disturbance and are less damaging to soil aggregates. In particular, soil organic matter, which helps bind soil particles together, is better preserved with less tillage.

Fertile topsoil has been eroded from this paddock.



Wheat crop growing in previous year's stubble.



- Improvement of soil condition so that water infiltrates the soil more and runs off less. Soil structure is not only improved by less tillage but also by protecting the soil surface from the pounding action of raindrops. Some soils can be made more porous by applying gypsum.
- Contour banking and contour cultivation. Structures and techniques that direct water movement across slopes rather than down them will slow flow velocity and give water more time to infiltrate the soil. Contour banks are designed and constructed to slow flows and guide them towards stable watercourses that can convey water downstream without scouring. Cultivation furrows on the contour act as "mini" contour banks, holding water back in furrows and directing smaller flows across slopes.

Water erosion cannot be controlled or eliminated as intense rainfall events can occur causing erosion despite the best efforts of land managers. However under "normal" conditions, water erosion should not happen if appropriate practices are used.

Stubble retention and "one pass" seeding of crops reduces the risk of water erosion.

