Chapter B9. How do I control erosion?

PURPOSE OF THIS CHAPTER

To describe strategies for controlling erosion

CHAPTER CONTENTS

- why control erosion?
- strategies for controlling erosion

ASSOCIATED CHAPTERS

- A3 'Features of soil'
- D6 'Improving soil structure by crop rotation'
- D7 'Cultivation and soil structure'
- D8 'Landforming and soil management'

WHY CONTROL EROSION?

On-farm benefits of controlling erosion are:

- reduced loss of soil
- reduced loss of nutrients attached to soil particles
- reduced damage to plants by burial and sandblasting
- less gullying to interfere with paddock operations
- reduced damage to fences and roads
- less silting of dams and channels.

Off-farm benefits of controlling erosion are:

- less pollution of watercourses with sediment and nutrients
- less silting of off-farm roads, dams and drains.

Soil lost from erosion gullies can never be completely replaced (Figure B9–1).

STRATEGIES

The adoption of an integrated package of soil management strategies will reduce the risk and severity of soil erosion from vegetable-growing lands. The strategies are complementary and will not be effective if used in isolation.

Assess paddock for erosion risk

Take time to assess the paddock for soil erosion. Ridge-tops and upper-side slopes will be less likely to erode than lower-side slopes subject to run-off waters from above.

Pinpoint steep slope segments and watercourses as areas of high risk. Give some thought to the location of headlands and direction of planting. Care in these areas can reduce the steepness and length of rows and associated erosion risk.

Figure B9–1.

Soil lost from erosion gullies like this can never be completely replaced. (Ben Rose)

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Strategies for wind erosion control on sandy soils (see E3.1)

Kikuyu paddocks cultivated for potatoes, for example, have high organic matter levels and are less prone to erosion. Native pasture country quickly works to a fine tilth, and is lower in organic matter and more susceptible to erosion.

Avoid steep slopes

The erosion risk increases as the slope gradients increase. Guidelines are:

- 0%–10%: preferred slope range, lower erosion risk
- 15%–20%: very high erosion risk
- more than 20%: should not be cropped.

Manage water flow properly

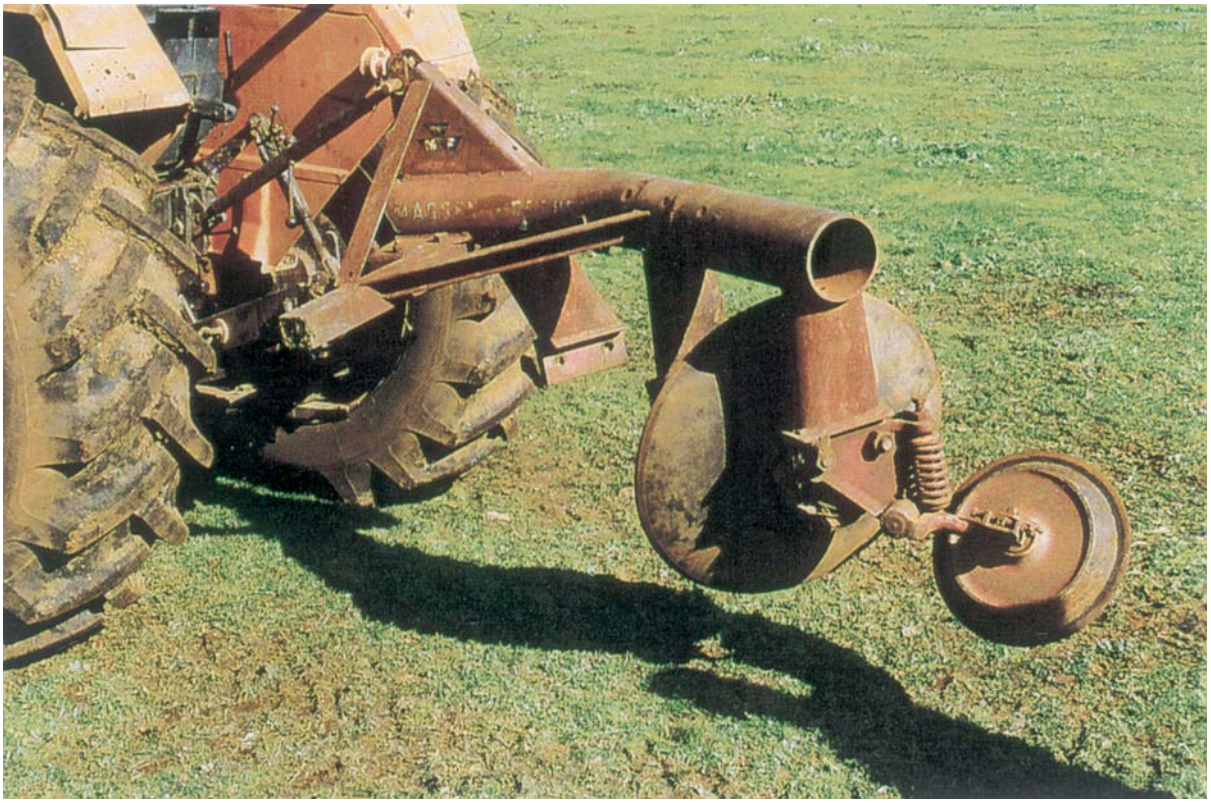
- Don't disturb natural watercourses. Keep on-site watercourses in a natural grassed condition for the safe disposal of stormwater run-off. Exclude them from all tillage operations.
- Divert external run-off. Use grassed diversion banks, waterways or drains to divert run-off coming from up-slope paddocks, road surfaces and culverts away from cropped country. Use them to divert run-off from higher unworked country within a paddock to prevent run-on and erosion in lower cropped sections.
- Control and safely dispose of crop surface water. Consider using shorter rows. Control and dispose of surface water safely within the vegetable crop by using temporary banks and strategic diversion banks and silt traps to intercept stormwater run-off. Use natural

watercourses, constructed waterways and dual purpose irrigation runs/waterways to dispose of water (Figures B9–2 and B9–3).

Figure B9–2.

A grassed waterway with temporary grade furrows leading into it. (Ben Rose)

Figure B9–3.



A three-point-linkage disc plough is ideal for constructing grade furrows. (Ben Rose)

Reduce tillage operations

Reduce the number and type of tillage operations. Excessive cultivation will break down soil structure, leading to compaction and soil erosion.

Soil organic matter not only contains nutrients required by plants, but also binds the soil particles together to form larger aggregates that give a soil its structure. Each cultivation encourages decomposition of organic matter and breaks up the bonding responsible for soil aggregates, so each cultivation further breaks down soil structure.

After rainfall and run-off, the soil settles and is less susceptible to erosion. However, each subsequent cultivation disturbs the soil and detaches soil particles; with rain further soil erosion results.

Reducing the number of cultivation operations will benefit the soil structure and reduce soil erosion.

Use herbicides for weed control in the growing crop in preference to cultivation.

Machines that hill and plant in the one operation will reduce the number of soil workings and allow the soil to settle and develop a ground cover of grass and weeds. When sprayed off with herbicide, this cover will provide mulch on the ground that will protect against rain and stormwater run-off.

Less pulverising and deeper working machinery such as mouldboard ploughs can increase the seedbed depth and reduce the number of cultivations and thence the physical damage to the soil structure.

Consider using herbicides to reduce tillage operations in ground preparation.

Avoid the unnecessarily fine seedbeds caused by overworking and harrowing when pastures follow vegetables.

Consider minimum tillage.