

# Managing soil erosion in vegetables



# Fact sheet

## How well am I doing?

### Ways to reduce soil loss from your farm

Reduce the potential for water to cause erosion by:

- stopping external water flowing onto and through your paddocks
- removing water safely from paddocks
- reducing the speed of water flowing across the land
- creating stable seedbeds that resist erosion
- maintaining a protective ground cover.

### How well do you keep soil on your farm?

Have a look at the list of activities below and see how many you have in place. Not all of the practices will be relevant or appropriate to your farm, but as a rule of thumb you should have at least half of them in place to effectively avoid erosion during heavy rainfall.

Only tick off an activity if you can answer ‘yes’ for **all** the relevant areas of your farm. For example, if only half your cultivated paddocks on sloping ground have grassed diversion banks above them, you would mark it ‘x’ (not in place).

Activity	Comments	Yes (✓) No (x) or N/A
<b>Site selection</b>		
I avoid growing vegetables on slopes greater than 20%	Steep slopes obviously cause rapid erosive water movement. The preferred slope range for growing vegetables is 0% to 10%. Slopes above 5% require soil conservation practices. Slopes above 10% need extensive erosion controls. These steeper slopes also pose other problems, such as unsafe machinery operations and inconsistent irrigation.	
<b>Field layout and planning</b>		
I use grassed diversion banks above my sloping vegetable production areas to divert external runoff	Diversion banks will prevent runoff from higher areas flowing onto and through cultivated land, taking soil with it. Water should be diverted to stable grassed drainage areas outside cultivated paddocks.	
I keep row lengths short by inserting vegetated cross-drains (or headlands) and directing water from these into a grassed drain	Shorter rows will prevent water building up and reduce the speed of the flow down the inter-rows. Grassed cross drains and/or mounds slow water down over the susceptible inter-row soil and direct it into grassed drainage areas or stable water courses where soil cannot be eroded.	



Activity	Comments	Yes (✓) No (x) or N/A
I plan and prepare grassed drainage areas and headlands and direct runoff water into these areas	A good cover of grass on drainage areas, headlands and non-production areas protects the soil from water and wind erosion.	
I allow a vegetated buffer space of at least three metres between my vegetable crops and waterways	A three-metre grassed buffer area that follows the contour will filter sediment and nutrients from water before it enters the waterway. The buffer area needs to follow the contour so water will move evenly through it.	
<b>Cultivation</b>		
I avoid cultivating through drainage areas, natural watercourses and low points in a paddock	Runoff water will flow fast and in large quantities through these areas during storms. Grass stabilises these areas and prevents erosion. The vegetation may need regular slashing to assist rapid removal of water from the paddock.	
I keep the number of cultivations for seed bed preparation to a minimum	Cultivations result in soft and uncovered soil, which is ideal for erosion. More cultivations keep the soil at risk of erosion for a longer time, and each cultivation contributes to structure breakdown, compaction and reduced organic matter. Organic matter improves soil structure, which will make the soil less likely to erode.  Spraying out fallow cover crops or volunteer growth with herbicide rather than cultivating to start seed bed preparation is one way to reduce the number of cultivations and the time soil will be uncovered during seedbed preparation.	
I minimise the use of cultivation equipment that is hard on soil structure	Rotary hoes and disc cultivators usually cause more soil damage than tyned and non-inverting implements.	
I avoid cultivating during times of the year when heavy rainfall is likely	Heavy rainfall can happen at any time of year, but is more likely in spring and summer in Queensland. It won't always be possible to avoid storms on freshly cultivated soil, so other erosion control practices need to be in place to reduce problems.	
<b>In-field practices</b>		
I allow volunteer plants to grow when the vegetable crop is finished to have soil cover during the fallow period	Some cover is better than no cover, and natural grasses and other volunteer growth (weeds) can provide this. If using this option, you must spot-control invasive (noxious) weeds and preferably slash or kill the volunteer growth before weed seeds are formed. Growing bulky cover crops is a better option because they add more organic matter to the soil and the weed seed problem is avoided, but this can be limited by the amount of water available to grow the crop.	
I grow bulky cover crops or commercial crops in rotation with vegetables	Bulky cover crops maintain better soil cover than volunteer growth outside vegetable production periods, and add more organic matter to the soil when incorporated. The cover crop may be a pasture or cereal species that is not harvested for profit, or a bulky commercial crop such as sorghum, sweetcorn or sugarcane. Most growers would not contemplate irrigating a non-commercial cover crop, so it will depend on rainfall during the fallow period. Commercial crops being rotated with vegetables would need to be irrigated.	
I add lots of organic matter to my soil	Organic matter benefits the soil in many ways, including helping to bind soil particles together, making the soil more resistant to erosion, particularly sands and sandy loams. The organic matter can be added as a soil additive, such as sugar cane trash, mill mud, hay or compost. A cheaper alternative is to grow bulky mulch crops and cultivate them into the soil or spray them off. This forms a surface mulch that then breaks down into the soil. Organic matter must be largely broken down before vegetable crops are planted otherwise damping-off can cause plant losses with some crops.	

Activity	Comments	Yes (✓) No (x) or N/A
I maintain a permanent soil cover mulch by growing a bulky fallow crop and slashing or spraying it out before planting, then annually planting fallow and vegetable crops into the mulch	<p>In this experimental system, called a reduced tillage system, machinery that can sow or plant into the mulch layer is needed. The soil is not cultivated for seed-bed preparation. The mulch provides permanent soil cover and improves soil health.</p> <p>This system appears to be easier to manage in temperate climates, but is being trialled in tropical and subtropical areas.</p>	
I control weeds in the crop by means other than soil cultivation (such as mulching, herbicides, flame)	Cultivation results in bare soil and, over time, poor soil structure, reducing the soil's ability to resist erosion.	
I plant inter-row mulch crops once crop beds are formed	<p>Cover crops, such as oats or millet (in autumn/winter) or sorghum (in spring/summer), will reduce soil erosion from water running down the inter-rows. Inter-row water volumes are greater where plastic mulch is used.</p> <p>The 'living mulch' can be slashed or sprayed with herbicide (or a combination of these) before it seeds. The living crop binds the soil and slows water flow. The dead inter-row crop will form a mulch cover along the inter-row and continue to protect the soil.</p> <p>The mulch crop could be grown, sprayed out and flattened before vegetable planting to avoid disease risk or standing mulch interfering with other crop management activities.</p>	
<b>Streams, major drains and buffer areas</b>		
I keep buffer and drainage areas outside the crop covered with grass or other vegetation (not noxious weeds)	Couch or carpet grass are suitable for drainage areas. Deep drains or steep bare drain sections would benefit from a tough deep-rooted species, such as vetiver grass, to stabilise the site.	
I maintain native vegetation, or have replanted native vegetation, on and near the banks of waterways running through or alongside my property	Vegetation acts to strip silt (and to some extent nutrients) from runoff water entering creeks and streams. Native trees and shrubs will also stabilise the stream banks.	
I maintain silt traps or dams in strategic drainage areas on my property	Silt traps or dams slow runoff water so that silt is deposited in the trap or dam. If the traps overflow, only the heavier fraction of the soil is caught, and the more fertile fine clay particles, along with organic matter and nutrients, are lost. Silt traps must be large enough to handle the volume of runoff, and be able to hold water long enough for silt to drop out. The best strategy is to prevent soil loss from paddocks in the first place. Silt traps are really a backup and are most useful in combination with other erosion-preventing strategies.	
<b>Farm roads and tracks</b>		
I design and site farm roads and tracks so they have less than 10% grade, have a slight crown or cross slope and (where possible) are sited on ridge lines or embankments	<p>This reduces the likelihood of a lot of water pooling and flowing down roads and tracks. Once a track becomes a drain, it will quickly scour.</p> <p>Eroded roads and tracks not only contribute soil to waterways, but affect access and product quality from field to packhouse.</p>	
I use diversion banks to prevent runoff from up the slope flowing onto roads and tracks	This applies to roads and tracks running across slopes. Diversion banks on the top side of the traffic way can redirect water to grassed drains or under-track culverts.	

Activity	Comments	Yes (✓) No (x) or N/A
I maintain earth banks on dirt roads and tracks running downhill.	Earth banks, or 'whoa-boys', constructed at regular intervals at a slight angle across roads and tracks help prevent washouts. Ensure the water is redirected into a stable drain alongside the road or track.	
I use culverts or pipes, or build bridges to lift trafficways over drains and streams. Alternatively, I stabilise roads and tracks crossing through major drains and streams	Traffic through wet and muddy drainage areas and creeks stirs up the soil. This soil is then easily moved into waterways and other environmentally sensitive areas further downstream when the drains and creeks flow. Culverts, pipes and bridges carry traffic over the drains and creeks. Stabilised crossings (or fords) through drains and creeks are another option. Crossings can be stabilised using materials such as concrete, stones or blue metal with a diameter of at least 50 mm. All options will need regular maintenance.	

## How did you score?

If you ticked fewer than 12 activities (meaning you have fewer than 12 of these activities in place on your farm), then you need to do more to control erosion. Don't become complacent because of the drought. One big storm and you could lose a lot of your soil.

If you ticked more than 12 activities, then you are doing OK. You only need to concentrate on the gaps identified from completing this checklist. What else could you do to reduce erosion? Mark the ideas you can use and put them on your list of things to do.

## More information

- 'Managing soil erosion in vegetables: see what's working for South East Queensland growers' is available from the Department of Primary Industries and Fisheries (DPI&F).
- *Healthy soils for sustainable vegetable farms* – Ute Guide (AUSVEG Ltd 2007) Contact AUSVEG:  
Tel: (03) 9544 8098  
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Email: [info@ausveg.com.au](mailto:info@ausveg.com.au)
- Soil erosion fact sheets from NSW Department of Primary Industries are available at [www.agric.nsw.gov.au](http://www.agric.nsw.gov.au) (go to 'Natural resources, environment and climate', then 'Soil health and fertility', then 'Soil erosion').

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