



# Saving Soil

A landholder's guide to preventing and repairing soil erosion



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Stephanie Alt, Abigail Jenkins & Rebecca Lines-Kelly  
**NSW Department of Primary Industries**



**NSW DEPARTMENT OF  
PRIMARY INDUSTRIES**

Title: Saving Soil – A landholder's guide to preventing and repairing soil erosion.

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Published by Northern Rivers Catchment Management Authority

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First published March 2009

ISBN 978 0 7347 1953 9

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The information contained in this publication is based on the technical knowledge and understanding of the authors and several reviewers, and is current at the time of preparation (January 2009). However, because of advances in knowledge and possible changes in legislation and regulations, users are reminded of the need to ensure that information upon which they rely is up to date, and to check currency of the information with appropriate government agencies or the user's independent adviser.

This publication was developed for the Northern Rivers Catchment Management Authority (NRCMA) whose area covers most of the NSW North Coast and some of the Northern Tablelands. Throughout the publication we use the term 'region' to refer to this geographic area. While much of the information will apply to areas outside this region, significant variation in soil types, geology, climate and topography may occur in other areas and advice should be sought from local authorities.

Where the source of an image is not noted the source is NSW Department of Primary Industries (NSW DPI).

## NRCMA Region



**Saving Soil – A landholder's guide to preventing and repairing soil erosion** brings together current information from a variety of sources that will provide the reader with a useful resource to:

- understand techniques to prevent and remedy erosion
- apply these techniques to their landscape and soil type
- integrate erosion control in their routine land management
- fix minor erosion problems
- know when to seek technical expertise
- know what to ask experts.

This guide is designed for new and long time landholders, community support officers, extension officers, Landcare groups, and agricultural industry bodies. We have used the terms landholder and land manager interchangeably, as in many cases the individuals concerned with erosion issues may not be the legal owners or occupiers of the land, or identify as farmers.

Saving Soil is available online at NSW DPI's website and in print through the Northern Rivers Catchment Management Authority.

Thanks to the following people who contributed their time and expertise.

### Northern Rivers CMA

Peter Roberts and John Clerke

### NSW Department of Primary Industries

Bede Clarke, Justine Cox, Wayne Garrard, Greig Ireland, Geoff Lowein, Kerry Moore, Kevin Quinlan, Mark Stanton-Cook, John Wilkie, Lyn Andersen, Charlotte Jenkins and Johanna Kempff

### NSW Department of Environment and Climate Change

Michael Eddie, Graeme Goldrick and David Morand

### Technical advice

Jim Thomson (formerly NSW Department of Lands, and NSW Soil Conservation Service)

### Editing

Peter Haskins and Rebecca Lines-Kelly

### Design

Carleen Imlach, evoke design

This book was produced collaboratively by NSW DPI and Northern Rivers Catchment Management Authority.

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[Eroded soil in Richmond River floodwaters at Ballina, 2004. Source: Colin Cooksey](#)

## Introduction

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Soil erosion is one of the world's major environmental issues. Each year wind and water erode 75 billion tons of soil, most of it from agricultural land. Erosion is a natural process but is accelerated by practices such as land clearing, overgrazing and soil cultivation. It removes fertile topsoil that contains most of the soil's plant nutrients and soil microorganisms that contribute to soil health. The subsoil that remains is less fertile.

## Why we need to protect soil



[Lost topsoil means reduced fertility.](#)

not be obvious – a 1 mm loss of topsoil per year represents a loss of around 14 tonnes per hectare per year.

The loss of soil through erosion has been implicated in the downfall and destruction of many civilisations. The loss of fertile land can lead to economic disruption, food shortages and dislocation of rural populations. In the last 40 years over 30% of the world's farmland has become unusable because of soil erosion.

Due to its high rainfall, high rainfall intensities and steep topography, the Northern Rivers CMA region has a high risk of soil erosion. This risk will increase if predicted climate changes such as hotter, drier seasons and more severe summer storms occur.

Financial losses incurred by soil erosion, and the cost of fixing it, mean that erosion prevention is a much better option than remediation.

Soil is essentially a non-renewable resource because it erodes much faster than it forms. In NSW soil forms at a rate of 0.04 to 0.4 tonnes per hectare per year, but losses from grazed pastures can be around 1 tonne per hectare per year.

Cultivated paddocks commonly lose 1 to 50 tonnes per hectare per year.

These rates of soil loss may

For instance, stabilising a gully headcut can easily cost over \$10,000 in earthworks and materials, and that is before the gully is fenced off or remediated. Fencing off a watercourse as soon as erosion is noticed may avoid the need for any other gully works. Gullying in macadamia orchards reduces the efficiency of machine harvesters, requires expensive manual harvesting, and increases the trees' needs for fertiliser. Implementing erosion control works in a mature orchard is much more difficult and expensive than in a new orchard.



[An eroding dam spillway](#)

A 1 mm loss of topsoil from a 1 hectare cropping paddock means a loss of over 14 tonnes of soil, including nutrients and organic matter. If the soil continues to erode, nutrient requirements will continue to increase. Minimising erosion maintains soil fertility and keeps input costs low.

## Look, investigate, and act to protect your soil

### Look

Take time to walk over your land, especially after heavy rain, checking for changes that might indicate soil erosion. Look out for bare soil, exposed tree roots, soil pillars, rills (shallow gullies), muddy runoff water, sediment fans and silted dams.



[Exposed tree roots](#)

Check where water collects and flows on your land as these areas are vulnerable to erosion. Take photos of the same locations at regular intervals to help you pick up changes. Use monitoring tools like erosion pegs to get an idea of the rate of soil loss.



A line on an erosion pin shows the original soil level.

Monitor your soil health with the Northern Rivers Soil Health Card ([www.dpi.nsw.gov.au/agriculture/resources/soils/testing/health-card](http://www.dpi.nsw.gov.au/agriculture/resources/soils/testing/health-card)) because erosion removes the finer soil fractions that contain most of the nutrients and enhance water-holding capacity.

It's also important to check farm infrastructure including tracks, banks, constructed waterways and dams for any signs of damage.

## Investigate

When you see erosion occurring think about what is causing the problem, and how you can fix it. There may be more than one factor to consider and manage.



A sediment fan means erosion upslope.

The cause of the erosion may be higher in the catchment, resulting in downstream damage to pasture or cropping areas. For instance, upslope land clearing can lead to mass movement lower in the catchment.

Consider the timing of any actions to reduce erosion. Often it's best to make any changes or complete works during drier winter months to avoid having bare soil in the summer storm season.

## Act

Act on any erosion when it's a small problem. Addressing the problem means both repairing erosion damage and treating the cause, so that erosion does not re-occur. Make soil erosion management part of your routine activities. Evaluate the erosion risks and impacts of your regular activities and make changes where appropriate.



Sediment build-up in a watercourse indicates there is major erosion in the catchment.

When starting a new land use or activity, design the site to cope with water flows so that erosion never becomes a problem. Seek advice and plan major erosion rehabilitation projects carefully to get the best value from your efforts.



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<http://www.dpi.nsw.gov.au/agriculture/resources/soils/erosion/saving-soil/>