Fact Sheet

9 Soil Erosion and Acidity

Land

Soil Erosion and Acidity Issues

Soil erosion and acidity are natural processes in the Australian landscape, but since European settlement, changing land use and management practices have increased these natural processes. The condition of our soil has declined through vegetation clearance, grazing, cultivation, the introduction of exotic flora and fauna and the use of fertilisers, herbicides and pesticides. Soil erosion and increasing soil acidity are two of the biggest problems that have arisen from agricultural land management practices.

Soil erosion occurs when soil particles are washed or blown from one site to another. Land that is used for agriculture usually has a higher rate of soil erosion than areas of native vegetation. When there are big rains or winds, soils that are not protected by vegetation are blown or washed away. The effects of climate change such as a drier climate and an increase in severe weather events is likely to increase soil erosion.

Rates of soil erosion have decreased over the last 50 years due to improved management, but much more needs to be done to ensure long-term sustainability. Land susceptible to soil erosion is less likely to erode if the soil is left undisturbed and is protected by a layer of plant material. If the soil surface is loosened or the plant material is removed then even light winds or water-flows can erode the soil.

Many soils have natural levels of acidity. Agricultural processes can make soils more acidic, for example, using fertilisers and growing legume crops and pastures. Strongly acid soils are likely to cause nutrient deficiencies and/or toxicities in plants, and this can severely reduce plant production. A decline in plant production is not only bad for farmers in the short-term but it can also contribute to the rise of the water table, dryland salinity and erosion. Rates of soil acidification and the size of affected land continue to increase in most agricultural areas.

Trends

Rates of soil loss to water and wind erosion are **slowly declining** but unsustainable levels of soil loss still occur during extreme weather events.

Protection of agricultural cropping land from erosion is slowly but steadily **increasing**.

Extent of acid soils and soil acidification in South Australia are **increasing** and will continue to increase unless remedial action is significantly increased.

> **"Soil acidity is increasing in South Australia."**

Soil Erosion and Acidity

What is the Current Soil Erosion and Acidity Situation?

Pressure indicators

The area of agricultural land susceptible to wind erosion

It is very difficult to measure actual soil loss from erosion, so working out which areas are at greatest risk of erosion has been used as a way of understanding the current situation. Soils that are at risk of erosion are generally sandy in texture, occur in areas of low rainfall, and are exposed to extended periods of dry weather.

There are about 10.4 million hectares of agricultural land in South Australia and around 6 million hectares (58%) are susceptible to wind erosion. Of this, around 21% has a moderate to moderately high susceptibility to wind erosion due to sandy soil types and higher elevation (eg sandy rises and sand hills). Most of this area is on the Eyre Peninsula, and in the Murray Darling Basin, the South East and the Northern and Yorke Natural Resource Management regions. About 3.6 million hectares are characterised as having a moderate to low susceptibility to wind erosion.

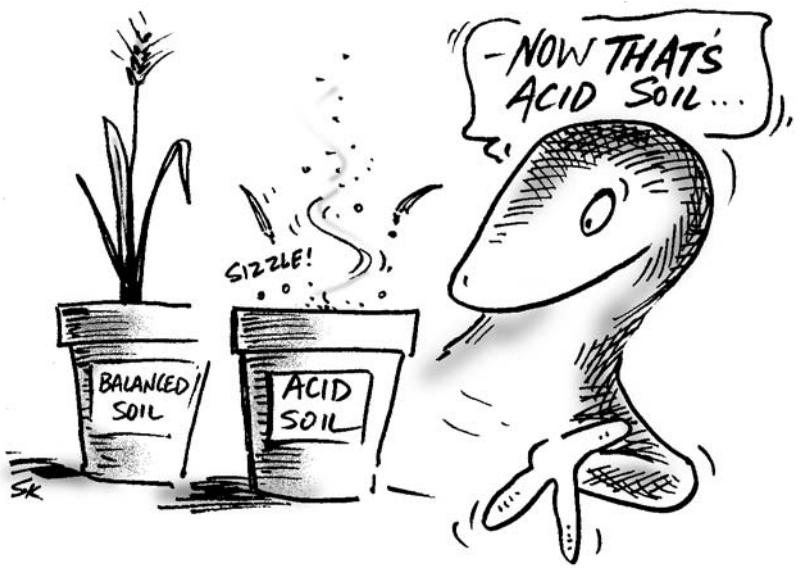
> “1.9 million ha of agricultural land is affected by soil acidity.”

The area of agricultural land susceptible to water erosion

Approximately 1.2 million hectares (or 12%) of cleared agricultural land in South Australia have a moderate to moderately high risk of water erosion. The Northern and Yorke NRM region has the greatest proportion of land in this category and this is due mainly to soil type and the slope of the land. A further 1.7 million hectares have a moderately low susceptibility to water erosion.

The area of land at risk of soil acidity

Soil acidity is widespread across South Australian agricultural land, but is less of an issue here than in other states. Soil acidity has already led to a decrease in productivity in agricultural land. As the intensity at which we crop the land increases, the rates of acidification are also increasing. About 1.9 million hectares (10%) of agricultural land is affected by soil acidity, and strongly acidic soils always occur in high rainfall areas. The South East region has the largest area of land at risk of soil acidification – 35% of the state's total risk.



Soil Erosion and Acidity

Responding to Soil Erosion and Acidity

The **Department of Water, Land and Biodiversity Conservation (DWLBC)** monitors erosion levels across the state. It is very difficult to measure the actual amount of soil lost, so the number of days that soil is either protected or at risk from erosion are counted instead. Soil with a high level of plant material covering the surface is classed as protected while bare soil would have a high risk of erosion. The government has set a target to increase the protection of agricultural cropping land from erosion by 20% by 2014.

Farmers are changing some management practices to help decrease the risk of soil erosion. After harvest of some crops, particularly wheat and barley, the remaining parts of the plant are left in the ground (stubble retention). Even though the plants are no longer growing, their roots systems help hold the soil together and the plant stalks provide protection from wind erosion. There has also been lots of work done by community groups in the last decade to help prevent land degradation. These groups have planted many native trees, shrubs and grasses on agricultural lands around the state.

Soil condition has improved over the last 50 years, and improved crop practices such as the application of lime have helped combat soil acidity. Lime is a common name for various forms of calcium, and adding calcium to the soil helps decrease acidity. Applications of lime have been decreasing over the last few years and there are still very large areas of land that are continuing to acidify to damaging levels.

Taking Action for Soil Erosion and Acidity

Join your local Landcare or Bushcare group and help to plant some local species of native trees and shrubs in your area to help stabilise the soil.

Impacts of

Soil Erosion and Acidity

Economy

Very acidic soil can reduce crop productivity by up to 50%. The cost of wind erosion in the agricultural areas of the state is estimated to be around $8 million per year.

Health

Wind blown dust can cause problems for people with asthma and other respiratory problems.

Inland Waters

Water erosion brings soil and fertilisers into watercourses, swamps, estuarine and marine areas. This degrades these areas through increased siltation (build up of soil) and nutrient levels.

Atmosphere

Dust storms created from eroded soil can result in atmospheric pollution.

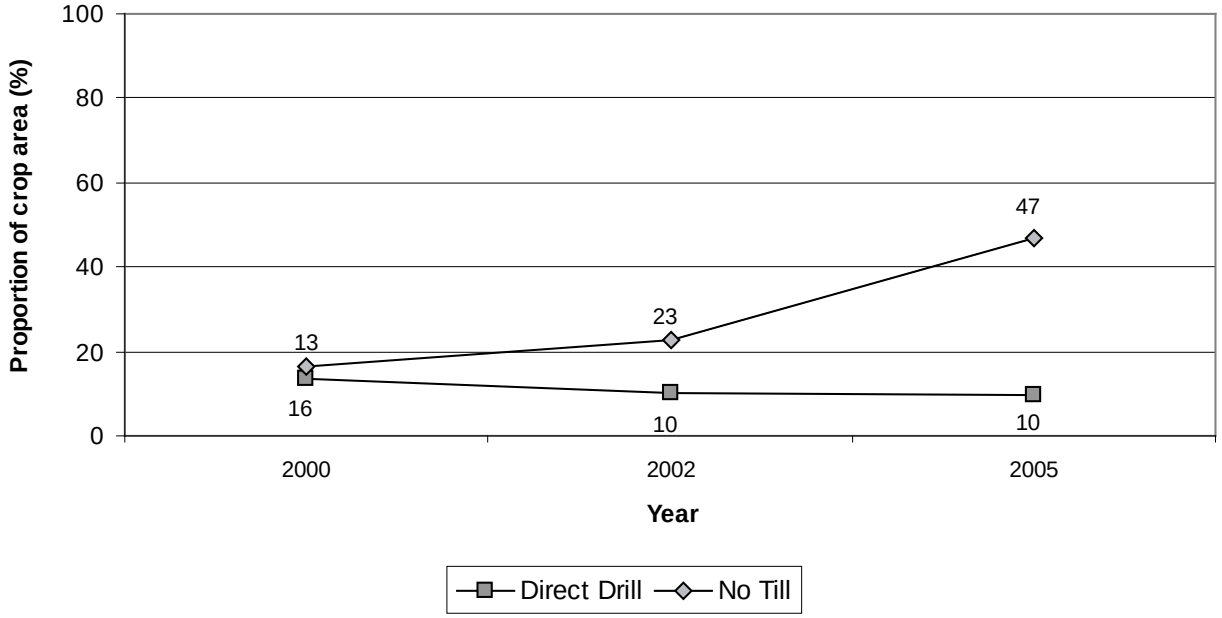
Attention!!

Improving land management practices

Land managers across the state are becoming more and more aware of the impact of erosion on their land. Improved land and crop management practices have helped to improve soil condition over the last 50 years. Some land managers use direct drill sowing so that the only cultivation occurs while sowing the seed. No-till sowing is where the seed is placed in a narrow slot in the soil to minimise soil disturbance. These practices help to reduce soil erosion.

The **South Australian No-Till Farmers Association (SANTFA)** began in 1998 as a farming organisation with a focus on sustainable farming systems. SANTFA provides education and information for farmers who would like to adopt better practices and for farmers seeking to improve on the conservation measures they already have in place. SANTA has over 1,150 members and the focus is on helping farmers meet economic, environmental and social sustainability.

Change in the proportion (%) of crop area sown using no-till and direct drill methods in South Australia



Source: Department of Water, Land and Biodiversity Conservation

> "Land managers across the state are becoming more and more aware of the impact of erosion on their land."

Research Ideas

about Soil Erosion and Acidity

1 What is meant by 'soil erosion and acidity'?

2 How do soil erosion and acidity affect the environment?

3 How have human activities affected soil erosion and acidity in your community, South Australia, Australia and globally?

4 What does the State of the Environment report tell us about the extent of soil erosion and acidity in South Australia?

5 What might happen in the future if things continue as they are?

6 What are government, business and industry doing to address soil erosion and acidity issues?

7 What can we do individually, or in communities, to reduce our impact on soil erosion and acidity?

Resources

For more information on SANTFA you can visit http://www.santfa.com.au.

For more detailed information on the issue and actions you can take see the State of the Environment report for South Australia 2008. This is available at: www.epa.sa.gov.au/soe

This fact sheet is part of a set of 20 fact sheets about the key environmental issues identified in the State of the Environment report 2008, produced for the Environment Reporting Education Resource. You can access the fact sheets and learn more about taking action for the environment at the Education Resource website: www.epa.sa.gov.au/soe.
For more information call the Environmental Education Unit of the Department for Environment and Heritage (08) 8463 3911.

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