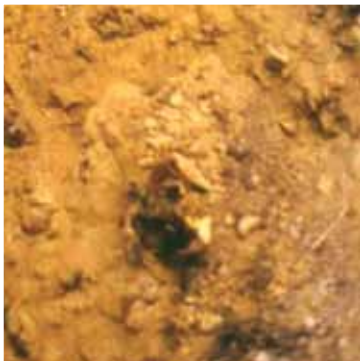
The James Hutton Institute

What on Earth?

Your Soil Health Explained



You could be forgiven for writing-off soil as just dirt, but if we didn't have soil we wouldn't have food to eat, or freshwater to drink.

Even the paper on which this is printed came from trees that couldn't have grown without a soil that was fit and well.

This leaflet explains the importance of soil to our everyday lives and why a healthy soil means a healthy nation.

Soil can affect what is in our air and water and we will explain why this is the case.

It's Alive!

Soil is teeming with life - much of which we cannot see – but like all living things it can become unwell and even die if it isn't looked after properly.

You might be surprised to learn there are more living things in one teaspoon of soil than there are people on the planet. One gram of soil can contain several billion bacteria from thousands of different species.

Many life forms make soil their home, and in turn most other animals depend upon them for food.

Life within soil ranges from the microscopic (such as bacteria and other so-called microorganisms) through to more recognisable and well known species such as earthworms, and many rare types of ant.

The roots of plants that grow within it are another important form of life that we find in soils.

And then there are the various large animals that make their homes in it. In fact, the world's largest living thing – a honey mushroom measuring over 3 miles across – has been discovered lurking in the soil beneath a North American forest.

Every single life form on land depends on a healthy soil to survive. The plants, the animals which feed on the plants, and the animals that eat the animals which feed on the plants – none of them would exist if it wasn't for a living soil.

Last gasp?

Breathing is a sign of life – and soils are no exception.

With all that life in soils it is no surprise that, just like us, soils produce carbon dioxide as a waste product and breathe it out into the air.

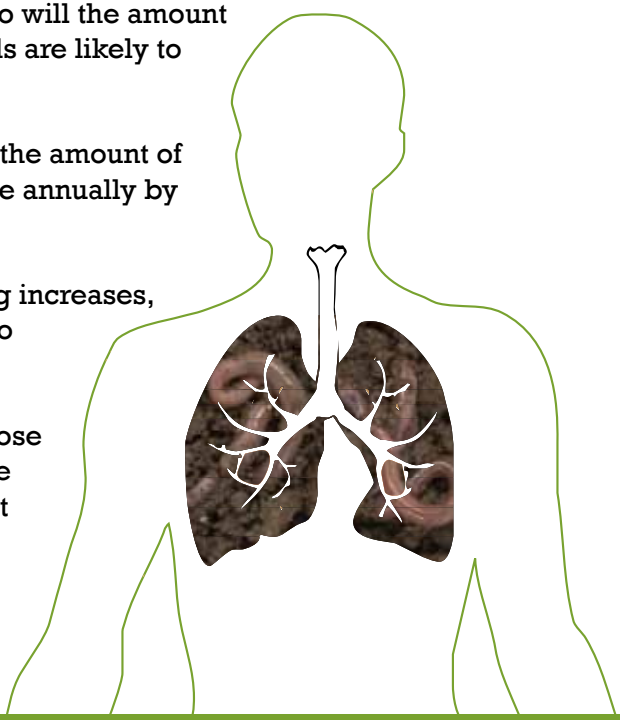
The rate at which they do this is dependent on - amongst other things - moisture and temperature.

As our climate changes, so will the amount of carbon dioxide our soils are likely to breathe out.

Soils hold about 30 times the amount of carbon dioxide we release annually by burning fossil fuels .

If the rate of soil breathing increases, it will greatly contribute to further climate change.

The carbon that soil will lose in this way has been in the soil for a long time - and it will take a long time to replace.



Wet, wet, wet

The human kidney removes harmful toxins whilst regulating the body's water content. Soils perform a similar role for the environment...

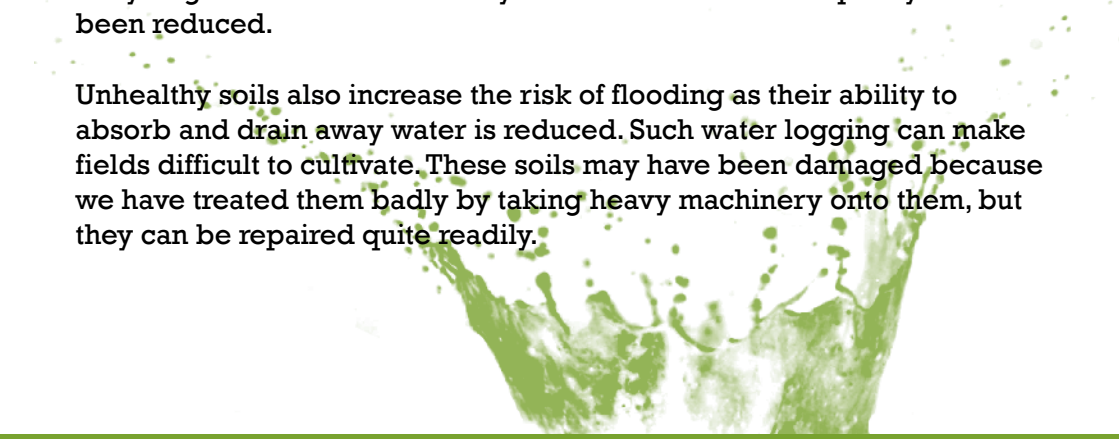
Soils filter water, making wastes and pollutants harmless, thereby providing us with safe, clean water.

However, damaged and degraded soils can seriously affect our waterways and our water supplies.

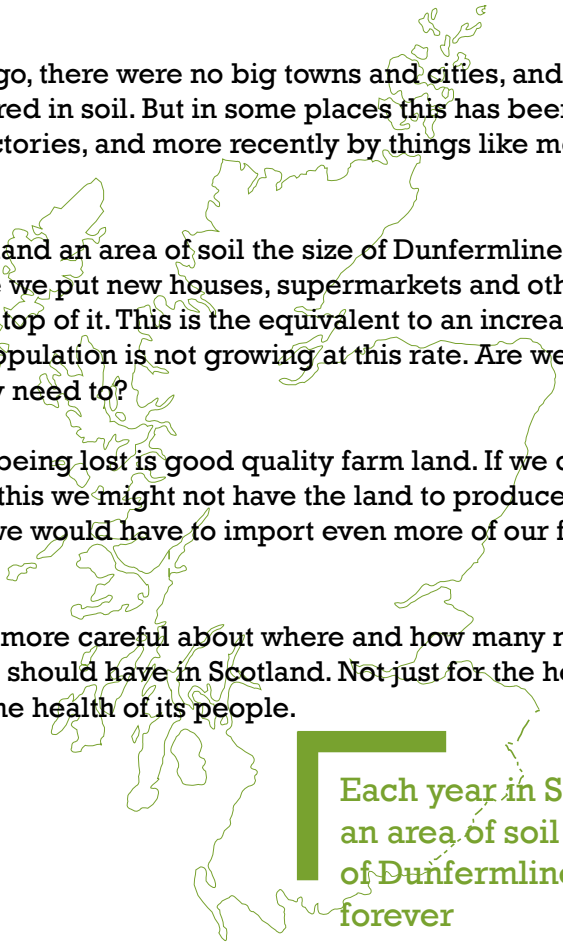
Some soils are less able to retain pollutants than others. This can increase the runoff of these pollutants into rivers, which causes problems as algae increase by feeding on the nutrients washed downstream.

These algal blooms can starve other species - such as fish - of oxygen. They might be colourful but they indicate that the water quality has been reduced.

Unhealthy soils also increase the risk of flooding as their ability to absorb and drain away water is reduced. Such water logging can make fields difficult to cultivate. These soils may have been damaged because we have treated them badly by taking heavy machinery onto them, but they can be repaired quite readily.



Foundation of the nation



Many centuries ago, there were no big towns and cities, and the whole country was covered in soil. But in some places this has been replaced by houses and factories, and more recently by things like motorways and airports.

Each year in Scotland an area of soil the size of Dunfermline is lost forever – because we put new houses, supermarkets and other building developments on top of it. This is the equivalent to an increase of 50 000 people, yet our population is not growing at this rate. Are we using more soil than we really need to?

Much of the land being lost is good quality farm land. If we continue to build on it like this we might not have the land to produce enough to eat– meaning we would have to import even more of our food from abroad.

So we need to be more careful about where and how many new developments we should have in Scotland. Not just for the health of the soil, but also for the health of its people.

Each year in Scotland an area of soil the size of Dunfermline is lost forever

Can't stand losing you

Third degree burns or a severe cut can permanently remove the skin from the body- when this happens to the soil (the skin of the planet) we call it soil erosion.

In some parts of the world it is the start of the formation of deserts.

If soil is left without the protection of covering vegetation it becomes vulnerable to the scouring action of wind and rain.

Some soils become degraded because water washes it away. When it is washed into waterways it causes more sedimentation and silting downstream, contributing to problems with water quality, and when it is very serious it can get into the gills of fish and kill them.

Some soil erosion can be prevented if we manage our soils more carefully, in the same way that some human illnesses are preventable if we take care of our health.

10 ways+

to improve your soil health

1 Always remember soil is a living thing - it needs to breathe and feed - so add organic matter and avoid flooding with water. If you can get some, add organic fertiliser (but try not to use peat).

2 Don't try and work your soil when it is too wet - it can damage the structure.

3 Do not compact soil too much and avoid overuse of heavy machinery.

4. Compost and re-cycle garden waste.

5 Always only add the correct amount of fertiliser, weedkiller and follow instructions of when and where to apply.

6 Don't remove all the stones in soil, they are good for drainage.

7 Match your plants to your soil and try to plant as much as possible leaving the minimum of bare ground - this protects the soil from wind and rain erosion.

8 If you are moving plants or digging foundations try to retain the soil and re-use elsewhere.

9 Try and leave soil surfaces free to breathe rather than cover with concrete or tarmac. Use web matting instead of solid covering if you need hard standing areas - it can continue to filter and breathe.

10 Plant across slopes in rows or use terraces or walls to retain rain washed soil so it is not lost.

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