



FARMING
connect
cyswllt
FFERMIO

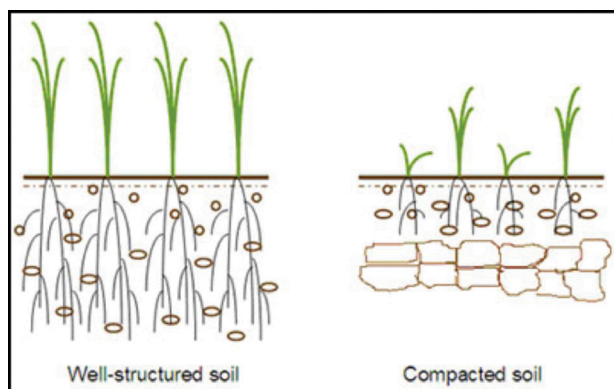
08456 000 813

Soil Compaction

Compaction is major issue on a global scale - it's estimated that it affects millions of hectares of land worldwide - is it an issue on **YOUR** farm?

What is it?

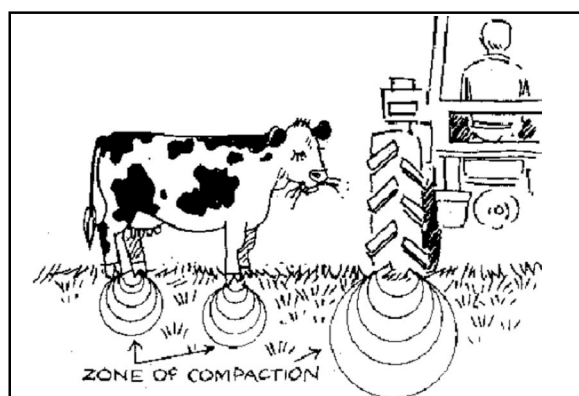
Compaction happens when the air is taken out of the spaces between the soil particles - this means that the soil becomes squashed and harder with less space for roots, air and water to pass through.



Compacted layer

What can cause it?

Wet soil is especially vulnerable - so *poaching* by cattle, sheep or other livestock and travelling over fields with *heavy machinery* will cause compaction. The compaction may happen near the surface or deeper down in the soil; this depends upon the weight and pressure of what's causing it.



Surface Capping



This takes place when the surface of the soil is broken up by prolonged, heavy rain. Once it dries, this forms a 'cap' or hard layer over the underlying soil. This makes it harder for seedlings to emerge from the soil, reduces water infiltration through the soil surface and increases run-off risk. Fine sandy and silty soils are particularly at risk

What are the effects on farm productivity?

- Lower crop yields (*due to restricted root growth, limited aeration and movement of water and reduced availability of nutrients*).
- Higher fertiliser usage (*compensating for lower nitrogen use efficiency*).
- Higher fuel usage (*extra energy required for ploughing for example*).
- Poorer economic performance overall.

What is the environmental impact?

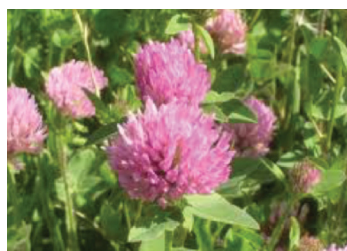
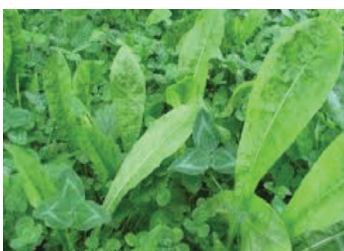
- Scientists tell us that a shift towards low or little oxygen in the soil means that levels of methane producing bacteria increase and levels of methane metabolising bacteria decrease - giving rise to higher methane emissions to the environment.
- More anaerobic soils may mean that processes affecting the breakdown of pesticides for example, are affected resulting in more being leached to the environment.
- Less freely draining, compacted, wetter soils are more prone to de-nitrification with higher levels of climate change gasses such as nitrous oxide being released to the environment.

What can we do to reduce compaction or stop it happening in the first place?

If all machinery and stock were removed, soil would, over time, recover from compaction without intervention - but this would take many years. The action of earthworms and seasonal cycles of freezing and thawing and the restoration of many of the biological processes would repair the soil.

When normal farm operations are taking place however, which usually means the movement of stock and machinery over the soil surface, or cultivations, then a strategy is essential to prevent compaction. The following should be considered:

- Stock movement when the soil surface is dry and firm
- Cultivating when soils are dry and friable
- Choosing the right machine and tyres for field operations
- Reducing the number of passes during tillage or shifting to min-till
- Increasing the organic matter and thereby the resilience of the soil
- Sowing seed mixtures of deeper rooting crops (*e.g chicory, legumes and grasses*) that improve soil structure



Further reading:

Better soil management: avoiding soil compaction. Author Dr Will Stiles; Farming Connect online.

The PROSOIL project IBERS, Aberystwyth University online

Soil Structure, Farming Connect Author Dr David Peers ADAS

