



Soil quality

The foundation of regenerative farming

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first milk[™]
The Regenerative Co-op

Soil quality: the foundation of regenerative farming

Farm management practices can change the chemical, biological and physical balance of soils. Analyse your soils regularly to monitor changes over time and gain insight into any potential remedial actions required to improve soil health and productivity.

The soil tests described here are free and relatively simple methods you can do yourself on the farm once or twice a year. They complement any laboratory tests you might be doing to analyse soil nutrients, soil organic matter or pH levels.



1. Earthworm assessments

When to count worms

The best time to conduct a worm assessment is in the spring or the autumn, when the soil is wet and warm. If the soil is too dry or waterlogged, you won't achieve a representative result. Aim to do two worm counts annually and in roughly the same months each year so you can monitor any changes over time.

How many pits to dig

For a true representation across the field, one sample isn't enough. Digging three pits per field is a good starting point.

What equipment do I need?

- a spade to dig the hole
- an old feed bag or piece of plastic on which to sort through the soil
- a container, such as an ice cream tub, to hold the worms during counting and identification.

How to do it

Dig a hole the width x length x depth of the spade (normally around 20cm). Remove the soil and place onto your sorting sheet. Work through the soil, breaking it apart and removing worms as you see them. In grassland soils, it can appear on first glance you don't have many worms, but often they are hiding in the grassland roots, so sort through carefully.

Count the total number of worms and record.

How many worms should there be?

In a healthy grassland soil, you should find 10-15 worms. If there are less than this, think about management options to encourage earthworm populations, such as remediating any compaction and adding organic matter.



2. Infiltration

Why test infiltration?

Soils should behave like a sponge and be able to hold water within its pore space.

How many tests to complete

Ideally an infiltration test should be completed at three sites across the field to provide an average.

What equipment do I need?

- a piece of metal pipe hard wearing enough to be hammered into the ground in multiple locations, 15cm diameter and 10–20cm deep
- hammer
- water
- tape measure
- stopwatch (available on most mobile phones)

How to do it

To see the result clearly, pull the surface grass and sward off the area you want to test, possibly cutting the grass short with scissors or a penknife. Drive the metal pipe a couple of inches into the soil so water added to the pipe cannot leak out. Pour 450ml water into the pipe quickly and all at once. Use a stopwatch to record the time it takes (to the nearest 30 seconds) for the water to disappear until there is no puddle visible although the soil surface will remain wet.

To watch a demonstration, scan the QR code
(timecode 2m 33 secs)



3. Spading ease

Why complete this test?

By attempting to dig soil using a spade, you can observe the ease with which the spade goes into the ground, although this test can be slightly problematic on stony soils, so choose a site carefully.

What equipment do I need?

- a spade

How to do it

When you are digging out the soil profile pit to complete other assessments, observe how easily the spade goes into the ground. Score this from 1-5 as follows:

1. 'OMG' Very difficult: requires both feet on the spade with jumping and wiggling required
2. Difficult: requires both feet on the spade with wiggling required
3. Moderate: requires both feet on the spade but no wiggling
4. Easy: some resistance, requires one foot on the spade with wiggling required
5. 'Like butter' Very easy: no resistance, full insertion in a single motion with one foot on the spade



4. VESS

What is VESS?

VESS stands for Visual Evaluation of Soil Structure and provides an assessment of the structural condition of the soil, including pore space and rooting activity.

How many tests to complete

Across the field, sample at three locations representative of the field conditions.

What equipment do I need?

- a spade

How to do it

Extract a soil block approximately one spade's width and depth (usually around 20cm) and examine the soil block for structure. Score the structural condition of the soil from 1-5:

1. Friable with a beautifully open structure
2. Intact with aggregates easy to break with one hand
3. Firm but most aggregates broken up with one hand
4. Compact, requiring considerable effort to break up with one hand
5. Very compact like concrete and difficult to break up

Soil type influences the score, so dig a few holes to understand your conditions. Photos may help for comparison and dig in an area you know may be compacted.

Scan the QR code for the VESS score chart.



5. Slake test

Why complete this test?

The slake (or aggregate stability test) is one of the best tests to do as it tells you so much about your soil health. This test shows the stability of your soil aggregates in water, an important metric of biological health as well as structural integrity.

What equipment do I need?

- a sample bag or container to remove soil from the field
- a container and some water

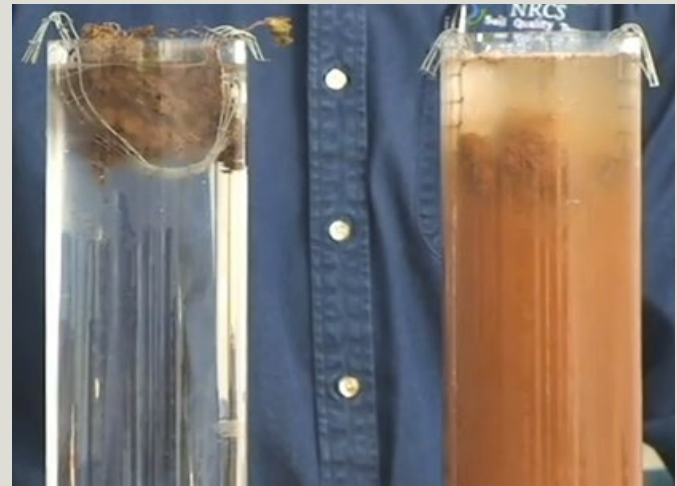
How to complete the test

Remove some soil from the field while completing the other assessments. Leave it to dry in the open bag or container for three days. Once dry, remove five small aggregates (1-2cm diameter) from the sample and place in a container of water on a flat surface. Look at whether the aggregates remain together or collapse, scoring them after i) five minutes and ii) two hours in the water.

Score from 0-4 as follows:

0. Aggregate remains completely intact
1. Aggregate starts to look ragged around the edges
2. Aggregate breaks into angular pieces
3. Aggregate breaks into a cone shape
4. Aggregate completely breaks down and the water is cloudy

After completing the two scorings (five minutes and two hours), the aggregates have a score out of 8. A lower score indicates better soil health and a higher amount of soil organic matter.



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