



Action points

- **Develop a five-year soil health testing action plan for your farm**
- **Be clear on the reasons for testing soil health**
- **Prioritise fields for soil health testing, especially where money and time are limited**
- **Compare the best performing field areas with the worst performing or field margins**
- **Choose soil physical, chemical and biological tests based on the main priorities and concerns**
- **Keep good records to track changes in soil health over time**
- **Collect additional weather data and information on crop yields, quality, health and ease of cultivation**

What is soil health?

Soil health is the ability of a soil to sustain, in the long term, its most important functions. A healthy soil will be able to sustain crop and livestock productivity and maintain or enhance environmental benefits. It requires a good balance of physical, chemical and biological soil properties, many of which can be tested.

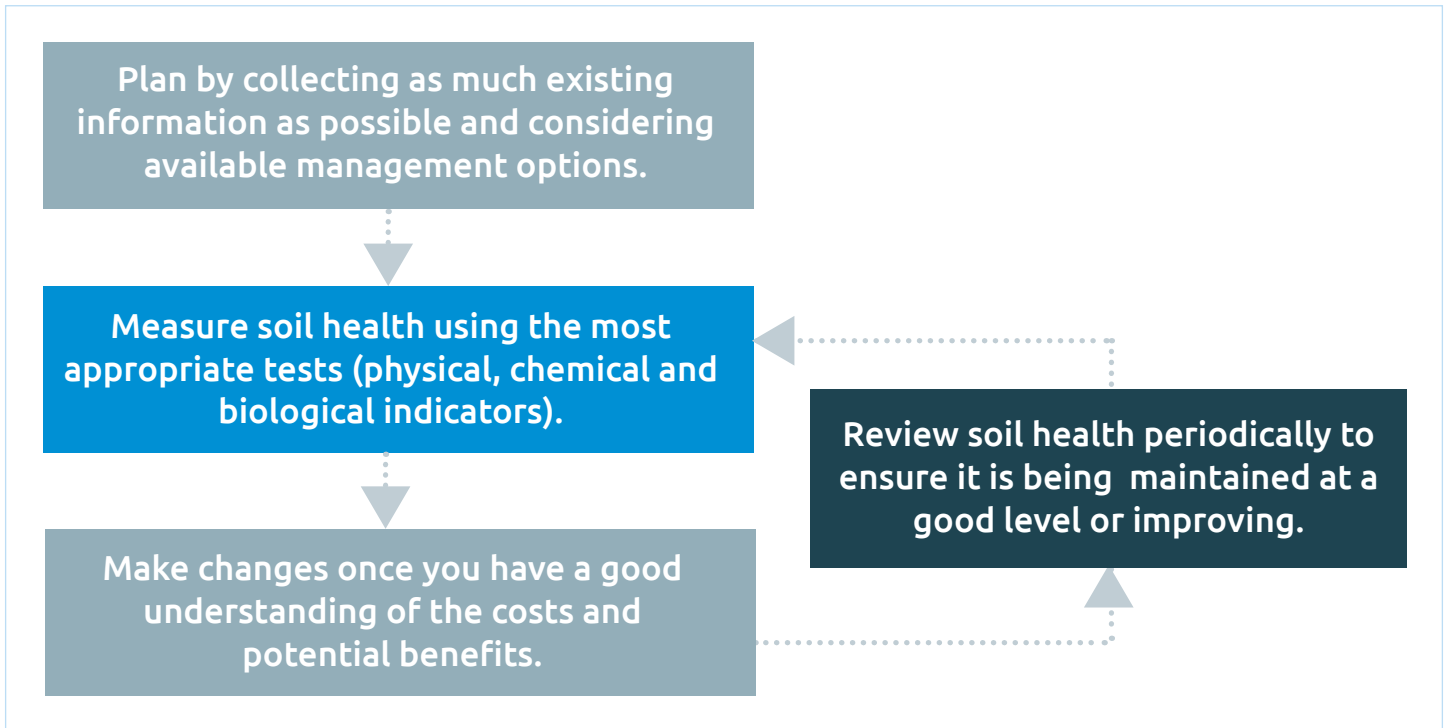
Why test soil health?

A field's soil health can often be improved and many farmers and growers consider adopting new approaches to achieve these improvements.

When planning major changes to a production system (eg a move to reduced tillage systems, an increased use of composts, green manures and cover crops, reintroduction of livestock or incorporation of crop residues), it is particularly important to gather good baseline data on soil health.

By testing a range of soil physical, chemical and biological properties, a good overall picture of how they affect the productivity of the land will be obtained. Over time, baseline information can be used to make management decisions that meet your objectives and help you measure success.

The following flow chart summarises the main considerations when planning and managing the health of your soil.



How do you test soil health?

Soil health tests are divided into three main types: tests of soil physical, chemical and biological parameters. Although some parameters are, arguably, more useful than others, it is generally recognised several need to be measured to give a useful indication of soil health. The AHDB factsheet ‘Soil Assessment Methods’ summarises key methods, their cost, and the time and skills required. It is available to download at www.ahdb.org.uk/greatsoils

Physical tests

Soil physical tests can provide information on how well soils can function under good and poor weather conditions. Physical condition is an essential component of soil health.

Soil texture and the other characteristics of the soil types occurring on a farm should be known and documented. Structural assessments, such as the Visual Evaluation of Soil Structure (VESS), can also be conducted. Such assessments can be used to help identify important constraints, such as the degree of compaction.

Chemical tests

Soil chemical tests should be chosen based on the production system and its perceived problems. The basic parameters – pH, nutrient status (P, K and Mg) and soil organic matter by loss-on-ignition – should be tested regularly.

Additional chemical tests can be selected based on the crops grown (eg soil trace element concentrations are useful in some situations). Although base cation saturation ratio testing has many advocates, there is limited scientific evidence to prove its value at present.

Biological tests

Soil biological tests include counting earthworms, measuring soil respiration and assessments of the soil food web. These tests are relatively new for most farmers and growers and information on interpretation and how to improve the values in soils can be unclear.



Soil respiration is a measure of the living microbial population within the soil and this test is available from some UK soils labs. Soil food web testing is at an early stage in the UK, but a small number of specialist labs now offer a service to provide information on the types of microorganisms (such as fungi and bacteria) .

The AHDB factsheet **How to Count Earthworms** provides simple guidelines and is available to download at www.ahdb.org.uk/greatsoils along with more information about biological tests.

Focus attention

If financial or time constraints mean it is not possible to test all fields on the farm, focus on those that will provide the most valuable information. For example, look at the extremes: compare fields that are performing well (eg easy to cultivate, with good crop health and yields) with those that are not (eg hard to cultivate, with poor crop health and yields). Look at in-field variation by using a similar approach (eg compare the best performing areas with the worst performing areas or field margins).

Bear in mind, soils of the same texture and type should be compared. Results should also be interpreted with the crops grown in the rotation in mind.

Effective record keeping

Keep good records, to track changes in soil health over time. Ideally, a file for each field should be kept. Lab results, notes on soil profile/soil structure assessments and yield figures are important, but additional information, such as comments on weather, soil conditions and ease of cultivation, is also worth keeping on record.



When should soil health be tested?

In general, soil health changes relatively slowly, although soil physical condition can be badly damaged in a single cultivation or harvest in wet weather. How frequently soil tests should be conducted varies considerably and depends not only on the test but also on the value of the crop. Some tests can be done annually, others every three to five years. Tests that measure gradual changes can be done every five years or more. To monitor long-term changes in soil health, tests should be repeated at the same point in the rotation.



Annual tests

Physical tests, such as digging soil pits, to look at soil structure and compaction as well as biological tests, such as earthworm counts, should, ideally, be done annually at the same time of year (usually spring and/or autumn).

Tests every 3 to 5 years

In general, tests for pH and major nutrients should be conducted at least every three to five years (potentially more often in light soils producing high value crops). Measuring soil respiration over this time period can also be considered, although guidance on interpretation of results is currently limited.

Tests 5 years +

Soil organic matter, as measured by loss-on-ignition, changes relatively slowly and there is little point in conducting tests more often than once every five years (potentially only every 10 years, unless significant amounts of organic matter have been applied annually).

Author

Audrey Litterick - Earthcare Technical Ltd

Further information

For more information on soil management, visit www.ahdb.org.uk/greatsoils

The GREATsoils web page also hosts practical guidance on how to assess soil structure, count earthworms, measure water infiltration and test the nutrient and organic matter status of soil.



Produced for you by:

AHDB
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

T 024 7669 2051
E comms@ahdb.org.uk
W ahdb.org.uk
@TheAHDB

If you no longer wish to receive this information, please email us on comms@ahdb.org.uk

While the Agriculture and Horticulture Development Board seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law, the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

© Agriculture and Horticulture
Development Board [year].
All rights reserved

AHDB