

The project is developing and piloting a web-based tool to aid decisions on soil management by benchmarking physical, chemical and biological indicators. This will allow farmers to take site-specific soil quality issues into account when planning and managing resilient and sustainable crop and grassland production for the long term.

Widespread consultation indicates that farmers would like to be able to monitor the health/ quality of their soils in response to management. However, soil type and climate vary dramatically between regions of the UK, and therefore there is no single set of targets that can be used.

You have indicated that you would be happy to get involved in an initial pilot this autumn. This document explains more about what will be involved and asks you to reply to confirm how you would like to be involved.

Each group of farmers involved at this pilot stage will:

- Meet the project team on one of your farms (if needed) to work through the sampling in early/mid-September;
- Follow the protocol when collecting soil information on farm in September/ October including recording field data on-line and submitting samples (about 40 in total per group) for analysis of pH, available P & K and soil organic matter;
- Meet to look at the results, discuss benchmarking and implications for management and play with data in the web framework in late November/ December.

Within farmer groups, farmers can opt to:

- i. Test the soil sampling app. to record data in the field (and/or in the office afterwards) and ...
- ii. Trial the full soil sampling protocol including observation of soil structure in field, submit samples for analysis and ...
- iii. Share data on pH, P, K, Mg and soil organic matter together with basic site characterisation information with the project.

You can opt in at the second or third levels. But note that opting in at a higher level means carrying out all the steps below. So opting in at the first level (i in the list above) means carrying out all the steps i), ii) and iii).



Outline sampling protocol for use in pilot phase - autumn 2017

A more detailed field protocol will be provided with recording sheets

Background

Soil observations and samples are collected on farm for a number of distinct purposes – e.g. checking the performance of fertilisation/liming strategies, planning new fertiliser applications, determination of timeliness for cultivations. This protocol is intended to fit within those approaches but not necessarily to replace them all; on any farm, there are likely to be further but complementary approaches to soil characterisation e.g. grid sampling of soil P/K for precision fertiliser management. **The aim of soil observation and sampling for soilquality.org.uk is to provide data to assess rotational soil health within fields and benchmark this with other similar sites (climate, land use, soil).** As a consequence the most appropriate sampling timing is considered to be both after harvest and also after the topsoil has wetted up in the autumn; this timing may mean that rotational sampling for soil health does not easily fit at all points of the rotation. In some rotations, this may mean sampling in an actively growing cover crop or after drilling of the next main crop. Ideally the sample should not be taken within 3 months of application of organic inputs, though this may not be able to be avoided if manures/composts are applied annually. Feedback from practice on this sample timing and the difficulty/ease of scheduling the sampling in this period is important in this pilot phase.

In this pilot phase, very few parameters are included for measurement, together we are focussing on testing the sampling and recording systems. However in the future, a range of other physical, chemical and biological measures could be included with the observations/analysis too. An AHDB Research Programme is developing and assessing such an indicator toolkit over the next few years.

Site selection and characterisation

The farmer is best-placed to determine their own representative sampling sites (within which soil texture, cropping show limited variation) and where these sites can provide useful data to monitor soil health and inform farm practice in soil management. There may be just one sample site per group of fields, or there may need to be several per field, where soil texture varies markedly. As for all soil sampling, the area selected should be relatively uniform. Avoid headlands, gateways, unless you are specifically targeting them as a sampling site, and also avoid marked wheelings where possible.

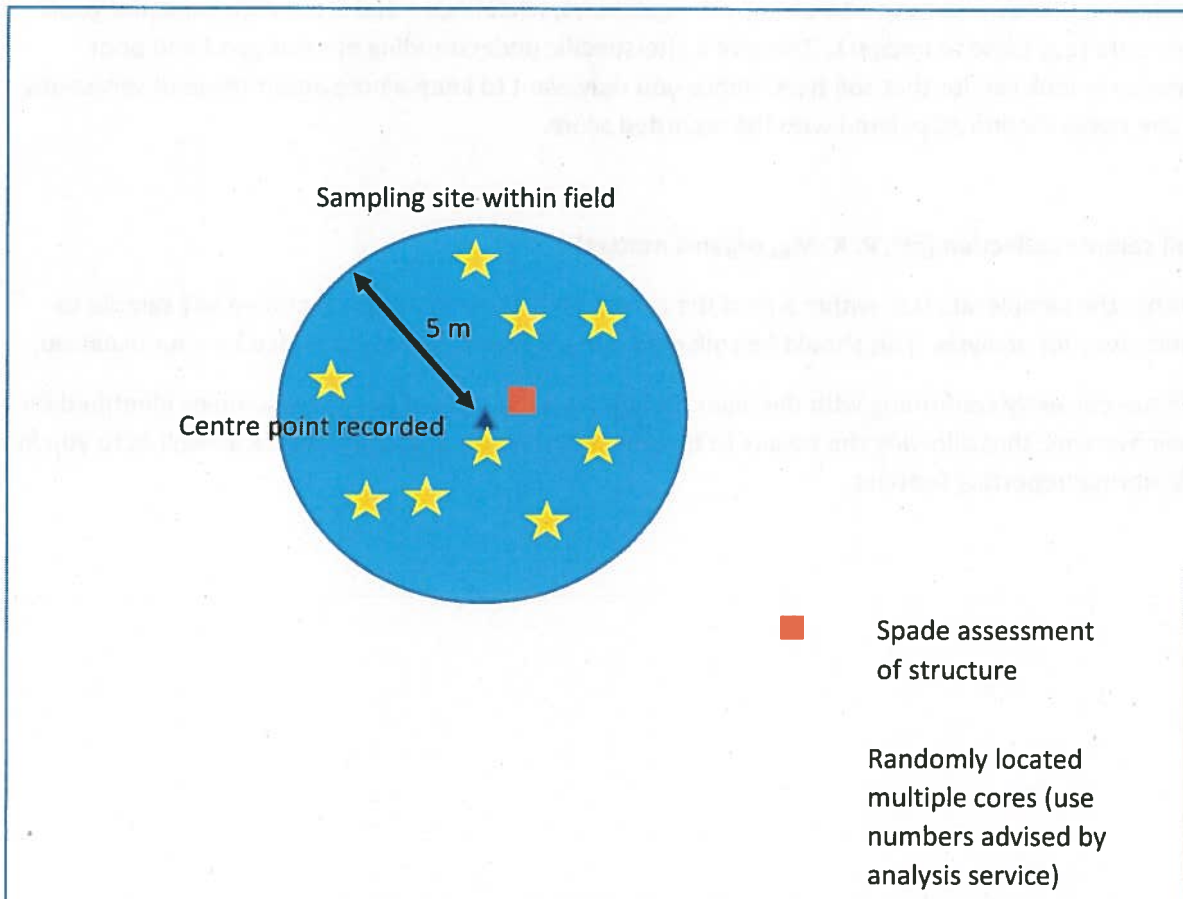
The location of the sampling site for soilquality.org.uk is recorded by its centre point and the sampling site is then considered to be the area within 5 m in all directions of that centre point i.e. a rough circle of 5 m in radius. It is likely to be representative of a larger area.

Accurate recording of location is possible *in situ* using a smartphone app. or using online mapping tools afterwards based on a paper record kept on site. In the pilot, farmers opting in at the first or second level will be asked to record site locations accurately. At the third level, farmers will be asked to identify sites by postcode / or nearest village.

Land use and soil type information for sites is chosen from simple pre-defined lists. These will be recorded for sites at all levels in the pilot. This information is used to set up groups for comparisons of data.

Land use	Topsoil (key characteristic)
<i>Cropping – combinable crops</i>	<i>Calcareous</i>
<i>Cropping – rotation including late harvested crops</i>	<i>Sandy and light silty</i>
<i>Cropping – rotation including leys</i>	<i>Medium (clay loams)</i>
<i>Cropping – field-scale vegetables</i>	<i>Heavy (clays)</i>
<i>Grassland – intensively managed</i>	<i>Organic</i>
<i>Grassland – permanent pasture</i>	

An Emailed version of a printable sample site record form will be provided to all farmers in the pilot, though for sites at the first level this should be superseded by the app. which should be used to record and submit site information together with the option to add photos.



Soil structure assessment

For farmers, opting in at the first or second level, a soil structure assessment should be carried out in the field within 2 m of the centre point of the sample site at the same time as a soil sample is collected for analysis (see below).

Ideally the soil should be moist to 30 cm but not saturated; hence it is possible to do these assessments on a damp/rainy day – but not at the end of a run of rainy days!

The agreed soil structural assessment protocol for use in the pilot is VESS (www.sruc.ac.uk/vess). The AHDB Healthy Grassland Soils field guide uses a near-identical approach and can also be used. This is a simple in-field assessment approach which requires a spade and a scorecard for comparison. Laminated scorecards can be provided by post where needed.

The score (between 1 and 5) will be recorded on-site. Different layers showing different structures may be observed to 25 cm, but the score recorded should be that of the most limiting layer (i.e. the highest score observed). For farmers in the pilot at the first level, the app will allow photos to be stored together with the recorded score.

For on-site understanding of soil structural quality and the possible impacts of poor/good management, it is often useful to compare the structure at the sampling site with soils where trafficking is known to have had an impact – gateways, wheelings – and areas with expected good structure (e.g. close to hedges). This give a site-specific understanding of what good and poor structures look like for that soil type. Hence you may want to keep a note about these observations in the notes section associated with the recorded score.

Soil sample collection (pH, P, K, Mg, organic matter)

Within the sample site (i.e. within 5 m of the centre point) collect a representative soil sample to send away for analysis. This should be collected and packaged as recommended by your usual lab.

We are currently confirming with the main UK labs how they would like these samples identified for their systems, thus allowing the results to be returned through soilquality.org.uk as well as to you in the normal reporting formats.

FIELD SAMPLE RECORD FORM

User name

Contact Email

Site (your reference as name or number)

Location

Ideally GPS reference (looking like 52.223N, 0.097E) or Grid reference, at least as nearest village, county

Topsoil (Cross-compliance texture class) – select one

<i>Sandy and light silty</i>
<i>Medium (clay loams)</i>
<i>Heavy (clays)</i>
<i>Organic</i>

Calcareous

Yes	No
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Laboratory (where sample sent for pH, P K, OM analysis)

Contact details

Client code, if any

Land use (select one)

<i>Cropping – combinable crops</i>
<i>Cropping – rotation including late harvested crops</i>
<i>Cropping – rotation including leys</i>
<i>Cropping – field-scale vegetables</i>
<i>Grassland – intensively managed</i>
<i>Grassland – permanent pasture</i>

Any field notes (current /previous crop, cultivation system)

Structure score (see VESS /Healthy Grassland Soil guidance)

1
2
3
4
5

Structure notes

Please let me have a copy of any paper forms, if you haven't completed the soil record via the app.
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