AHDB Information Sheet 05

Summer 2016

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

GREAT soils
Resilience, productivity and life

Soil assessment methods

Soil health

Farmers and growers are concerned about the current health of their soils. Most farmers and growers understand the importance of soil health for the productivity, sustainability and profitability of their business, but many face significant challenges when interpreting results from laboratory analysis or when choosing suitable methods for assessing the health of their soils beyond the standard pH, phosphorus (P), potassium (K), magnesium (Mg) analysis.

To be of value to farmers and growers, methods for soil assessment should not only measure soil health, but should also provide information that can be used to inform decision making in relation to soil management. This Information Sheet provides an overview of the various methods currently available.

Indicators of soil health

The functioning of soil depends upon a complex interaction between organisms large and small, chemical reactions in solution and on surfaces of clay particles, within a structure determined by natural processes and modified by soil management.

A broad range of appropriate indicators of soil health are therefore needed to evaluate the effects and sustainability of agricultural practices. The most commonly agreed and used indicators can be grouped in the three categories of (1) biological, (2) chemical and (3) physical parameters.

Latest information	Action
A number of new methods are available but require careful consideration and interpretation	Develop a soil management plan taking into consideration physical, chemical and biological indicators of soil health
Assess soil health, beginning with assessments you are comfortable with, progressing to those that are more complex	At several locations in 'good' and 'bad' areas of the field, representing different soil types, assess soil texture and structure

Assessment methods

During a series of grower consultations in autumn 2015, regional grower groups in Great Britain discussed different approaches to soil assessment, what methods they find useful and reasons why others are not very commonly used. They were asked to rate a list of categorised soil assessment methods, and the results can be seen overleaf.

Further information

AHDB Horticulture: horticulture.ahdb.org.uk/great-soils

AHDB Potatoes: potatoes.ahdb.org.uk/agronomy/soils

AHDB Cereal & Oilseeds: cereals.ahdb.org.uk/soil

healthygrasslandsoils.co.uk
(AHDB Beef & Lamb and AHDB Dairy)

Soil management plan for outside pig keepers (AHDB Pork)

This Information Sheet was funded as part of an AHDB Horticulture project (CP 107b) and is a collaboration with the Soil Association, The Organic Research Centre and Earthcare Technical. Further information is available in a more detailed literature review of soil assessment methods, conducted in 2015 by Anja Vieweger at The Organic Research Centre.

Soil Association
ORGANIC RESEARCH CENTRE
ELM FARM
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Want to know more?

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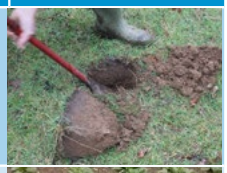
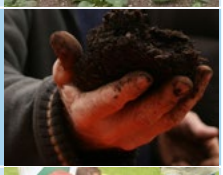
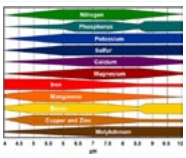
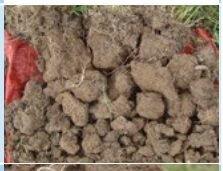
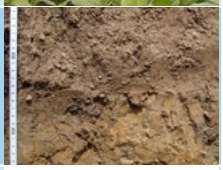
Soil assessment tests evaluated and rated by growers

1 = low; 5 = high rated by growers	Skill required	Time input	Cost input	Suitable for	Not suitable for	Comments from growers	
Spade diagnosis (depth 30cm)	**1**	**1**	**1**	Easy, quick, good indication of soil health, fast general impression of the soil status	Subsoil assessment, quantitative nutrient levels	Most common method used, very easy and informative; 'spade is always with me'	
Plant health monitoring (current and previous crop, weeds)	**1**	**1**	**1**	Early signs of nutrient deficiencies or compaction	Specific or quantitative information	Seasonal, need some experience and additional tests for details	
Total soil organic matter (SOM) (usually in %)	**1**	**1**	**1**	Total SOM (labile, stable and inert fractions of SOM)	Monitoring labile SOM (providing/ releasing energy and nutrients)	No need to do annually, need specific sampling technique	
Visual soil assessment tools (eg AHDB Healthy Grassland Soil methods)	**1**	**2**	**1**	Good overview of a wide range of soil health indicators (roots, worms, soil structure, colour)	Quantitative assessment of nutrients	Assessment speed comes with experience, easy to learn, need the tool only at first	
Standard lab test (macronutrients and pH)	**1**	**2**	**2**	Soil nutrient content P, K, Mg and pH	eg soil life, structure, compacted layers, root development	Regularly done, directly informs fertiliser strategy	
Visual evaluation of soil structure (eg SRUC VESS tool)	**2**	**2**	**1**	Soil structure and compaction detection	Quantitative assessment of nutrients	Some specific knowledge required	
Earthworm counts	**2**	**3**	**1**	Good indicator for soil structure and health, soil life and activity, soil biodiversity	Quantitative assessment of nutrients, subsoil assessment	Seasonal fluctuations, some skill required for species identification	
Micronutrient test	**2**	**2**	**3**	Trace elements/ micronutrient levels in the soil	eg soil life, structure, evaluation of compacted layers	Done only if deficiencies suspected in plants	
Soil pit/profile (depth range 30–150cm)	**3**	**3**	**1**	Subsoil assessment, horizons and exact location/depth of compacted layers	No quick results, is a rather destructive method, location of sampling important	Very useful results if done properly, good for structure assessment	
Soil health test	**3**	**2**	**3**	Measures pH, available P, K, Mg, texture, total SOM and respiration rate	In-depth evaluation and meaningful results/conclusions	Skill required for interpretation of overall results, eg respiration rates	
SOM balance modelling tool	**5**	**5**	**2**	Input/output estimation of SOM levels on field or farm level	Beginners in SOM assessment, basic day-to-day assessment	Not commonly used in UK yet, but might be a promising planning tool	
Soil life suites (eg food web tests, enzymatic activity, basal respiration etc.)	**5**	**2**	**5**	Bacteria and fungi, number, species and diversity (no standards yet)	eg soil structure, compaction evaluation	Skill required for adequate sampling and high skills for interpretation