

Visual Evaluation of Soil Structure

When to do an assessment

Sample when the soil is moist – if the soil is too dry or too wet it can be difficult to distinguish signs of poor structure. Spring or autumn should be the best time of the year and allows management decisions to be made to improve soil structure.

Where to sample

Take samples from areas where you expect **good structure** (uniform crop growth) and from areas where you expect **poor structure** (wheeled areas or areas near gates) to allow you to see structural differences.

Three steps to assess soil structure

Step one: Soil removal

In loose, freshly dug or recently tilled soils, simply push the spade vertically into the soil and dig out a spadeful down to a depth of about 25–30cm.

Optional step for detailed assessment: measure the length of the soil block.

In soils with a hard surface or under grass, cut out a spade-sized block of soil down to approximately 25–30cm. Cut down on three sides and then lever the block out leaving one side undisturbed.

Alternatively dig out a block and then take a slice from the undisturbed face. Carefully, lay the block on a plastic sheet or a plastic tray.

Step two: Soil assessment

Gently open the undisturbed side of the block like a book and start to break it up.

If the block breaks up easily into small fragments, then the structure is likely to be good.

If the block is hard to break up then it could either be held together by roots and you will need to pull these apart to expose the soil fragments, or it is compacted and breaks into large lumps.

Break up the block enough to allow you to discover if there are any distinct layers of differing structure. If the block is uniform assess as a whole, if there are two or more such layers, then score separately.

Optional step for detailed assessment: measure the depth and thickness of any distinct layers.

Step three: Soil scoring

Break up the soil with your hands into smaller structural units (known as aggregates). Give a score by matching what you see to the descriptions and the photos in the chart.

A score of Sq1 or Sq2 is good and should only require further monitoring, a score of Sq3 is moderate and may require more frequent further monitoring.

Scores of Sq4 and Sq5 are poor and require management action.

Further detail:

Soil assessment: the degree of firmness, the shape and size of soil fragments (clods and aggregates), root density and distribution as well as any evidence of anaerobism (colour, mottles and smell) are all used to identify the contrasting layers in the block. You can record your measurements and scoring on a spreadsheet available from the [SRUC website](#). A photograph at this stage provides a useful record and, when put together with others, allows comparisons to be made, both across the field and over time.

Soil scoring: If clods are large, compact lumps that can be broken into non-porous, sub-angular (sharp-edged) aggregates, this indicates poor structure and a higher score. Small, rounded aggregates or large aggregates that break down easily into smaller rounded aggregates indicate good structure and a lower score. After assigning a score from comparison with the pictures and descriptions in the chart, adjust it according to the difficulty of breaking apart of the fragments and their appearance. In grassland, roots make it difficult to break up the block, but this should not be a factor that increases the score.

Where there are layers present, score each layer separately. If the assessment is for management, then focus on the layer with the highest score and aim to improve the structure of this layer.

If you wish to calculate an overall block score for detailed research or consultancy use, multiply the score of each layer by its thickness and divide the product by the overall length.

For example, a block 25 cm deep with 10 cm depth of loose soil (Sq 1) over a more compact (Sq 3) layer at 10–25 cm depth has an overall score of:

$$(1 \times 10)/25 + (3 \times 15)/25 = \text{Sq } 2.2.$$

A simple spreadsheet is available that allows transfer of data from the field assessment form and the calculation of overall block scores. You can find it, along with other information, on the [SRUC website](#).