Identifying soil structural problems in the field
Identifying soil structural problems in the field
sandy and light silty soils

Identifying soil structural problems in the field / sandy and light silty soils
Identifying soil structural problems in the field / sandy and light silty soils / the soil surface

Sandy loam

High risk to slaking, runoff and erosion. Early drilling of cereals in September with good crop cover has helped to protect the soil surface.
poor structure

Sandy loam

Lack of crop cover and a fine tilth has exacerbated the slaking process. These soils are naturally unstable due to their low clay and organic matter content.
Identifying soil structural problems in the field / sandy and light silty soils / the topsoil

**Sandy loam**

Drilling of cereals at optimum soil moisture has ensured a good soil structure. Abundant roots help to stabilise the soil aggregates.
Identifying soil structural problems in the field / sandy and light silty soils / the topsoil

Sandy loam

Heavy traffic during harvesting of potatoes has compressed the soil. Cultivation is needed to remove the compaction.
Identifying soil structural problems in the field: sandy and light silty soils / the subsoil

**Sandy loam**

The low clay and organic matter content in the subsoil has resulted in natural slumping, producing a poor soil structure. However, the subsoil has many pores allowing good root growth. Absence of mottles indicates a free draining subsoil.
poor structure

Sandy loam

Compression of the wet soil by traffic and cultivation has produced a high packing density. Drainage and root growth are affected by the reduced porosity.
Identifying soil structural problems in the field / sandy and light silty soils
medium soils

medium soils
Identifying soil structural problems in the field / medium soils / the soil surface

**good structure**

Clay loam

The clay content is sufficiently high to give some stability to the soil aggregates, preventing capping of the surface.

- No evidence of runoff
- Stable clods
poor structure

Clay loam

Harvesting of maize has compressed the soil surface causing ponding of rainwater. This has subsequently caused the surface to slake and cap.
Identifying soil structural problems in the field / medium soils / the topsoil

Clay loam

Soil beneath a hedge, with a high organic matter content and soil biodiversity.
Clay loam

Compression of the soil has produced a high packing density and slight porosity. Cultivation of the soil when the soil is suitably dry will help to remove compaction.
Clay loam over clay

Grey and reddish mottle colours in the clay subsoil indicate waterlogging for part of the year. When wet, the subsoil is at high risk of compaction from traffic.
poor structure

Clay loam

The clay subsoil has been compressed by traffic and cultivation when the soil has been wet and plastic.
Identifying soil structural problems in the field / medium soils / the subsoil
Clay

The soil in this field is naturally acidic and is not as stable as calcareous clay soil.
poor structure

Clay

These clay soils are slowly permeable and are waterlogged for long periods. There are few days in the autumn where landwork can be carried out without damaging soil, particularly in high rainfall areas.

Excessive runoff and soil wash depositing sediment on gentle slopes
Identifying soil structural problems in the field

**Clay**

Abundant fine grass roots, earthworm activity and high organic matter have produced a good soil structure. Mottling indicates a naturally slowly draining soil, although good structure will improve drainage.
Clay

Stock trampling in wet conditions has compressed the topsoil, exacerbating poor drainage. The top half (where there is more biological activity) has re-structured.

- Very coarse (>10mm) plates with very firm soil strength and high packing density
- Strongly developed soil structure in the top half with fine, medium and coarse subangular blocks
**good structure**

Mottling indicates a slowly permeable subsoil. Naturally high packing density. High risk to structural damage from traffic because of long periods of waterlogged conditions.
poor structure

Clay

Naturally waterlogged subsoil with mottling. The soil has been compressed by traffic and cultivation in wet conditions. Improved land drainage would help to reduce the risk of damage to the soil.
Identifying soil structural problems in the field / heavy soils / the subsoil
good structure

Silty clay loam

An extremely calcareous shallow soil. The high silt content makes the soil vulnerable to slaking.

- Partly slaked, although there are many cracks in the surface
- Porous surface with no evidence of runoff
Identifying soil structural problems in the field / chalk and limestone soils / the soil surface

**Silty clay loam**

Although the soil surface has capped there is some shrinkage and re-structuring due to the high clay and calcium content.
Identifying soil structural problems in the field / chalk and limestone soils / the topsoil

**good structure**

Silty clay loam

The topsoil has a good soil structure that is stable due to the high calcium content that binds clay particles together.
Identifying soil structural problems in the field / chalk and limestone soils / the topsoil

**poor structure**

Silty clay loam

The top half of the soil has been compacted due to shallow cultivation in wet conditions.

Friable soil with medium packing density that is moderately porous

Medium (10-20mm) angular blocks with medium (2-5mm) plates
good structure

Silty clay loam over chalk

A shallow soil, where the chalk is less than 30cm deep, that is naturally well drained.
Identifying soil structural problems in the field
chalk and limestone soils / the base of the topsoil

poor structure

Firm soil strength with high packing density that is slightly porous

Very coarse (>10mm) plates

Silty clay loam

The base of the topsoil has been compacted. The soil sample was taken from the headland where there is more frequent farm traffic.
Identifying soil structural problems in the field
chalk and limestone soils
peaty soils

peaty soils - upland

peaty soils - lowland
Identifying soil structural problems in the field
peaty soils / upland peat / the soil surface

Upland peat / good structure

Peat

These soils are waterlogged for long periods. The land requires careful grazing to avoid damaging the soil structure.

No signs of damaged surface from cattle or vehicles
No evidence of ponding or runoff
Peat

These soils are not capable of supporting out-wintered cattle because they lie wet for long periods. They are easily poached and damaged by farm traffic.
Identifying soil structural problems in the field / peaty soils / upland peat / the topsoil

**Sandy peat**

Sandy peat with a moderately developed soil structure in permanent grassland.

- **Abundant fissures** allowing drainage, aeration and root growth
- **Moderately developed, medium (10-20mm) subangular blocks.**
upland peat / poor structure

Massive soil near the surface with very firm soil strength, high packing density and slight porosity

Weakly developed, very coarse (>10mm) plates

Sandy peat

A sandy peat that has been compacted by out-wintering of stock and farm traffic. The surface readily saturates, causing ponding and excessive runoff on slopes, even under moderate rainfall.
Identifying soil structural problems in the field / peaty soils / upland peat / the subsoil

**Upland peat / good structure**

Moderately developed, fine (5-10mm) subangular blocks. Friable soil with low packing density that is very porous.

Thin, impervious ironpan

**Sandy peat over sandy loam**

Sandy loam subsoil with thin naturally occurring ironpan. The ironpan restricts water movement causing waterlogging. Subsoiling can improve drainage by disrupting the ironpan.
upland peat / poor structure

Peat over sandy loam

Waterlogged most of the time due to high groundwater table. Stock and traffic have compacted the subsoil.
Identifying soil structural problems in the field / peaty soils / lowland peat / the soil surface

Very fine and fine granular soil, with medium and coarse subangular blocks (10-50mm)

A rough surface and larger clay content on ‘skirtland’ soil is at less risk to wind erosion

Peaty loam

Rough and coarse seedbeds are at less risk to wind erosion (although these are still vulnerable when the wind speed is greater than 20 mph).

Skirtland soils, where the peat has degraded (due to ‘wastage’), and where peat has been mixed with the mineral clay subsoil, are more stable and are at less risk to wind erosion.
lowland peat / poor structure

Dry fine soil with a loose consistency has a high risk of wind erosion.

Very fine and fine granular soil surface. Soil has slumped following rainfall leaving a smooth surface.

**Peaty loam**

Bare peaty fenland soils are at risk to wind erosion where the soil is dry and soil particles are less than 1mm diameter.
Peaty loam

Peaty loam topsoil with good soil structure. The large organic matter content produces a stable structure.
Peaty loam topsoil with poor soil structure along compacted wheelings.
Identifying soil structural problems in the field / peaty soils / lowland peat / the subsoil

**Peaty loam over silty clay**

Well-structured peaty loam overlying a silty clay mineral subsoil.

Agricultural land is highly dependent on artificial drainage to lower the water table. A low water table and good soil structure accelerate peat wastage due to oxidation, shrinkage and consolidation.
lowland peat / poor structure

Peaty loam over silty clay

Poorly structured peaty loam overlying silty clay. Farm traffic in wet conditions can damage the soil. Poorly structured soils have poor drainage which can lead to ponding and reduced crop yields. However, runoff is unlikely on flat fields.

Deep cultivation and subsoiling can correct poor soil structure, provided the soil is dry enough and there is an economic need.