The second meeting of the Climate Change Focus Farm discussion group at Castlemains focused on the benefits of taking a second look at farm soils and how this could improve farm profits.

**Key points:**

- Identify and remedy any soil structural issues.
- Assess organic matter content - how can you protect and build OM?
- Cover crops can help to improve soil structure but there are pros and cons to using cover crops.
- It is important to look after the biological component of your soil as earthworms help to improve drainage and recycle nutrients.

**Maximising crop yields**

But what shape are your soils in?

Assessing and improving farm soils was the main topic up for discussion between local farmers attending a recent group meeting at Castlemains by kind permission of Bob Simpson.

Guest speaker SRUC’s Bill Crooks stressed soils can often be overlooked when it comes to identifying factors that could be limiting yields. The group visited a number of fields to look at soil structure, discuss possible remediation measures, how to improve soil resilience and what to look for in their soils at home.

Visitors brought in examples of problem soils from their farm at home and SRUC’s Soil Specialists Bill Crooks and Bryan Griffiths were tasked with suggesting some remediation measures.
The value of good soil structure

Soil structure will influence crop profitability

Soil texture, the proportion of sand, silt and clay with the soils, is fixed. Soil structure however is something we can influence. Visitors were shown a simple way to assess soil structure by Soil Scientist Bryan Griffiths and PhD student Laura Thomas using the spade test (Visual Evaluation of Soil Structure or VESS). By looking a spadeful of soil you can begin to work out its structure; it is defined by the size and shape of the crumbs and lump that make up the soil which in turn create the porosity. Compaction will compress and remove these pores and channels, making it harder for roots to move thorough the soil and access nutrients. Poor soil structure also reduces the water holding capacity of soils, making crops more drought prone and increases runoff and flooding risks, as water is unable to infiltrate and be held in the soil.

For information on assessing soil structure, go to the Practical Guides Section of the FFBC website.

SRUC Technical Note TN656 has more information on how to identify soil texture.

Improving business resilience

Poor soil structure could impact on yields and profits, especially during challenging weather conditions.

Out in the field guest speaker SRUCs Bill crooks noted how soil structural quality can often be overlooked, but it’s worth taking a closer look at farm soils. Bill explained how in a good year, poorer soils may not obviously impact on yield, however if soils are challenged by adverse weather conditions such as drought or flooding, poor structure may really limit their ability to bounce back and support crops.
Many at the meeting were interested in cover cropping and what varieties could work for their farm. Farmers were put straight to work by Agronomist Cam Murray from Hutchinson’s and SRUC’s Donald Dunbar to provide a list of pros and cons associated with cover crops (see table). Cam explained how cover crops can help to reduce soil erosion, keeping nutrients on the farm - around 25 to 30% N can be lost from crops in winter through to spring. At current prices this could mean soil erosion is costing you £19/ha/year, which soon adds up when multiplied up across the farm.

Donald shared results from his recent SRUC cover crop trial which included mustard, vetch and Italian ryegrass. Some in the group established cover crops following harvest and were enthused by their results. One attendee is trying a Spring sown cover crop of clover to help field structure, provide a break crop and fix nitrogen for the following autumn sown crop.

With plenty of interest in cover cropping, the group plans to set up a trial at Castlemains, including a field scale demonstration of different types of cover crops established using both existing farm equipment and direct drill or minimum tillage to explore different varieties suited to the East Lothian area.

### Pros and cons of cover crops

#### Could cover crops work for your farm?

<table>
<thead>
<tr>
<th>Pro’s - Potential benefits</th>
<th>Cons and unknowns</th>
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<tbody>
<tr>
<td>Increase soil organic matter, invertebrate population and improved soil structure with differing rooting systems</td>
<td>What species/varieties of plants should be used for different soil types and soil problems?</td>
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<tr>
<td>Nitrogen fixing; provide organic N over time to next crop, reduce nutrient leaching, reduce fertiliser inputs</td>
<td>Seed rates, sowing dates and mixtures. Seed costs?</td>
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<tr>
<td>Improve drainage and drought resilience, reduce surface runoff</td>
<td>Establishment methods/costs?</td>
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<tr>
<td>Use to meet Greening &amp; Ecological Focus Area requirements</td>
<td>Does the potential benefit actually occur?</td>
</tr>
<tr>
<td>Provide alternative break crop</td>
<td>Disease and pest issues e.g. clubroot &amp; slugs</td>
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<tr>
<td>Provide grazing forage for livestock and improve land carrying capacity</td>
<td>Negative effects? Soil moisture, allelopathic effects, deep roots in field drains</td>
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Your hidden livestock
Healthy soils contain a range of bacteria, fungi, mites and worms benefiting soil structure and increasing organic matter

Routine field work coupled with the addition of inorganic fertilisers and pesticides, can have a negative impact on soil microbe and invertebrates populations, which will ultimately affect soil quality and resilience. SRUCs Bryan Griffiths and Laura Thomas explained about the value of the biological component of the soil, with worms providing a star role in terms of drainage, incorporating surface material into the soil, helping to recycle nutrients and improving soil structure. Numbers of earthworms present are a good indicator of soil organic matter content. Laura and Bryan explained some of the research work they were doing at Castlemains to assess soil quality by counting earthworms and measuring other soil parameters. At Castlemains this work is already yielding useful results, with a clear link between earthworm count and soil moisture content.

What’s next?
Come to our next meeting. We will be looking at the AgRECalc programme and how you can use it to work out your carbon footprint for your farm. Tuesday 10th November, 11am

Meetings are free to attend and all farmers are welcome.

For Castlemains, contact farm facilitator Chris McDonald on 0131 603 7522 or via email at chris.mcdonald@sac.co.uk for more information.

www.farmingforabetterclimate.org

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