

# Soil and Nutrient Network



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Helping farmers improve soil and nutrient management

## Case study - Aucheneck Estate, Stirling

Aucheneck Estates are farming at Aucheneck with the nearby units of: Hillhead of Catter, Shandon Drymen, Gallangard and Cairnlea, totalling some 1,915ha which is all rough grazing and permanent grassland.

The main enterprise is suckler cows. The business runs a herd of 600 suckler cows which starts with one farm running pure Shorthorn cows put to Shorthorn bulls with heifers kept for replacements. Another farm has pure Shorthorn cattle run with Simmental Bulls and heifers kept for other farms. Simmental Shorthorn cows are then put to a British blue or Charolais bulls. The calves are sold as stores at about a year old. None of them are finished on the farm.

Approximately every year 1000 ha of silage are made usually from two cuts using the farms own equipment. The spreading system used is mainly slurry based with some FYM which is middened for at least two years before being spread. Digestate is available from a local AD plant but this opportunity is yet to be explored. Recent rush control has taken place using a *rotawipe* with glyphosate.

Campbell runs the business with stockmen and a tractor at each individual unit to look after the livestock.

### Soil Compaction

Soil structure affects root penetration, water availability to plants and soil aeration.

Soil compaction was one of the main topics during the first meeting at Aucheneck. Sometimes there are obvious signs of soil compaction such as lying surface water, or yellowing of growing crops (indicating water logged soils). Often there are no such indicators and the only way to know is to undertake a soil assessment.

The good news is that soil compaction is easily identifiable - just get out there and dig some holes! Using the VESS Score Sheet you will be able to determine your soil structure and often at this stage, signs of soil compaction are easily identifiable. Check your fields to identify the level and extent of compaction. Knowledge of depth of compaction is key to what piece of kit is required to correct soil structure. Think about management changes that may be required to alleviate future damage.

Ensure tractors & trailers have wider tyres with lower air pressures; this will reduce depth of compaction. If possible change farm machinery to smaller and lighter kit as this will help minimise the compaction issue. At Aucheneck this change in farm management has reduced compaction in the silage fields.



Soil loosening is not a substitute for field drainage; one should only loosen as deep as required (not below an implement's critical depth). Don't run a soil loosener too deep as loosened soils can be very easily re-compacted.

Finally, tractor equipment for reducing compaction like: subsoilers, mole ploughs, aerators, sward lifters etc. will only bring about a benefit if used in the right conditions. For example, if a subsoiler is used on very wet field more damage to the soil structure may occur than the compaction relief desired!

For more information on the Soil and Nutrient Network see [www.fas.scot](http://www.fas.scot). For dates of SNN events, find us on Facebook or follow us on Twitter @FASScot.



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## Grassland Productivity and Cover Crops

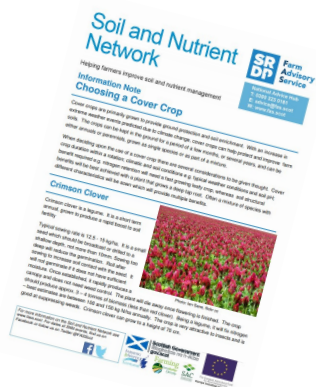
Improving grassland productivity should start with knowing the grass species that are in your sward. Knowing roughly the percentage of grass and weed species allows you to identify whether poor performing varieties (and weeds) are dominating. If 20% of sward is affected by these species consider spraying off with a herbicide and reseeding with a suitable mix for silage fields. Docks can have a considerable impact on your sward productivity if left unchecked and will need regular management to prevent loss of grass crop, and the ingress of smaller weeds such as chickweed later in the season once the wider dock leaves have died back.



Don't forget to manage soil pH to ensure that the grass crop can fully access all of the soil nutrients. For grassland soils aim for a pH of 5.8 - 6.0.

In arable situations, cover crops have three main benefits: Firstly, they bring a physical cover which reduces erosion of soil in between rotations. Secondly, green manures will increase soil fertility when incorporated back into the soil, bringing not only the captured nutrients within the green cover, but providing soil organic matter to boost soil levels. Finally, cover/catch crops will reduce nutrient losses that would occur if the soil is left uncropped between rotations.

Bear in mind your local climate, only certain areas can effectively grow particular species that will yield enough cover to bring benefits that ensure their use is cost-effective. Avoid bare soil. Find out more about cover crops from our ['Choosing a cover Crop': Information Note](#)



Ploughing in nitrogen fixing crops like red clover can provide 50-150 kg N/ha to the following crop and help with weed suppression. Ultimately a crop like this will reduce conventional fertiliser/herbicide costs and improve soil structure and health.

Drill grass seeds to an appropriate depth (0.5cm) and if broadcasting seed ensure a good seed to soil contact occurs to guarantee a successful sward establishment.

## Nutrient Management

Working with a dynamic nutrient management plan provides many benefits. It aids management decisions to match the application of organic manures to best match the crop nutrient need. When calculated correctly, it is possible to reduce inputs of inorganic fertilisers which in itself provides a number of benefits e.g. reducing unnecessary inputs to high status soils; targeting specific nutrients when soil reserves are low all the while preventing excessive applications of N,P or K over and above plant needs. This saves farm finances, can increase profitability and reduces diffuse pollution risks.

It is vital to target soil pH to allow the crop to make efficient use of any applied fertilisers. Liming maximises nutrient uptake of plants, allows for normal root development, improved water penetration function in the soils and has been found to make soil structure more resilient and less likely to become compacted. Soil pH should be a regular test undertaken every 3-5 years.

Getting a nutrient balance is essential: over applying nitrogen fertilisers is a complete waste of money, can cause damage to plants and is environmentally concerning. Excess Phosphorus can induce zinc and iron deficiency as well as lead to diffuse pollution problems, whilst excess Potash causes luxury uptake in plants which can result in an increased staggers risk in cattle.

At Aucheneck it was found that **£2,700** could be saved on the purchase of compound NPK fertiliser over 7 silage fields simply because the soil is already being supplied with adequate amounts of P and K from the FYM and slurry applications.

Scotland's soils have been indexed on their Phosphorus Sorption Capacity (PSC) i.e. how much P205 they can hold and release. Find out your farm's PSC from the [Scotland's Soils webpage](#) and target Phosphorus accordingly. Underestimating the nutrient value in organic fertilisers could increase the risk of nutrient losses into the environment, whilst overestimating the value could hamper crop yields. The financial value of farmyard manure can vary between £3/t and £28/t. Use it to the farms advantage, but remember:

**Analysis of your FYM/slurry allows you to target applications to specific fields to rectify deficiencies.**

### Useful Information

- Visit our webpage [www.fas.scot](http://www.fas.scot) for more information about the Soil & Nutrient Network and soil health and management.
- Visit [www.planet4farmers.co.uk](http://www.planet4farmers.co.uk) to download free to use nutrient management software for your farm.