# Soil and Nutrient Network

Helping farmers improve soil and nutrient management

Farm Advisory Service
National Advice Hub
T: 0300 323 0161
E: advice@fas.scot
W: www.fas.scot

## Revisiting our Soil Nutrient Network host farmers

The Soil Nutrient Network was established in 2016 through a range of host farms across Scotland. The hosts farm would be part of a "Nutrient Network" of farms demonstrating the benefits of soil analysis, nutrient budgeting and the principles of soil management for enhancing productivity, reducing pollution and enhancing biodiversity. A series of on farm meetings were held at each farm over the two year period where external speakers and local farmers could get together to discuss how we address our soil management practices.

In 2021 we revisited 4 of the Soil Nutrient Network farmers to discuss the impact being part of the project has had on their soil management, productivity and business. We have highlighted some of the key messages the host farmers took from the Soil Nutrient Network through a series of videos and case studies.

## Host Farm — Aucheneck Estate

Aucheneck Estates is owned by Campbell Graham and covers 1,915ha across South Stirlingshire. The land is all rough grazing and permanent grassland. The business is one of the largest beef suckler cow units in Stirlingshire, running a herd of 600 suckler cows which are a combination of pure Shorthorn cows put to Shorthorn or Simmental bulls with heifers kept for replacements. Simmental Shorthorn cows are then put to British Blue or Charolais bulls. After female replacements are selected calves are sold as stores at about a year old.

Approximately 170ha of silage is made each year, going into pit silage and 20ha of whole crop is grown as a means of establishing young grass. Due to the number of cows all housed throughout the winter the farms benefit from large quantities of cattle slurry with some FYM which is middened for at least two years before being spread. The scale of this enterprise allows Campbell to run his own machinery shared across the 4 units for all slurry spreading and crop harvesting.

## Lessons learnt at Aucheneck Estate

Aucheneck Estates used to grow crops such as Spring barley and turnips as part of a rotation, however Campbell has concluded his farms are best suited to growing livestock and so are now all pasture based. This has had a negative impact on his crop management with lime not being applied as often as required to maintain suitable pH. Through the SNN programme Campbell has undertaken more soil sampling and slurry analysis to identify the need for lime to raise soil pH and also the oversupply of phosphate when applied through organic manures and inorganic fertilisers.

Campbells key messages from being a Soil Nutrient Network host farmer are:

- Invest in soil sampling and lime application on a regular basis
- Consider the size of machinery being used regularly in fields to avoid soil compaction
- Analyse slurry and organic manures to take full account of the nutrients being applied.

Campbell is a firm believer in farming the land you have to suit its strengths, which for him is growing grass and he also advocates if you ‘look after the soil it will look after you’.

*For more information on the Soil and Nutrient Network see www.fas.scot ,For dates of SNN events, find us on Facebook or follow us on Twitter*

The European Agricultural Fund for Rural Development
Europe investing in rural areas
Scottish Government
Riaghaltas na h-Alba
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# Stirling Soil and Nutrient Network

## Soil Structure and Health

Dr Paul Hargreaves (SRUC) attended the second SNN meeting in Stirling to discuss soil quality and the characteristics of soil everyone should be aware of within their farm. Farmers need to be aware of the physical, biological and chemical components of soil.

Through the use of lab analysis for soils and manures we can assess the chemistry within our soils and this is arguably the easiest of the three components to influence.

From a biological perspective we need to understand soil textures and mineral buffering capacity as we may not be tapping into free nutrients!

When discussing the soil biological health, Paul revealed having a mixed species of earthworms was a vital component of maintaining soil quality. Soil compaction reduces worm numbers considerably and Paul was able to highlight how getting to know your soil through a VESS analysis and knowing your soil type can help identify areas that are compacted. Once identified, remediation can be done using suitable equipment for the level of compaction carried out under the right conditions. By only moving soil when you have to prevents carbon being released and soil OM levels depleting.

Regarding the physical components of soil, Dr Hargreaves stressed the need to optimise the water balance through a variety of means. Whether that be sward lifting, ploughing, aeration, drainage or mole ploughing we firstly need understand what the limiting factors are. Soils will perform better when there is more continuity in their porous space. Thus, addressing compaction to improve soil structure must be priority.

Soil has the greatest biodiversity of any organism on earth therefore maintain it, feed it, rest it, and you will reap financial and environmental rewards.

## Conclusion

The Stirling group has had a thoroughly educational and entertaining time at Aucheneck. Mr Campbell Graham was an excellent host, happy to share his experiences and take on board those of the groups and external speakers. Campbell's wisdom on how we manage our soils is very relevant and perhaps a component of our farming practices that has been forgotten over recent times: 'look after soil and the soil will look after you.'

Thanks to Campbell for reflecting over his time as a Soil Nutrient host farmer

## Nutrient Management Plan

The majority of nutrients applied to silage fields at Aucheneck come from cattle slurry and some FYM. By working with a dynamic nutrient management plan (NMP), this provided an understanding of nutrient wastage and crop requirements. The NMP created for Aucheneck aided the management decisions as it allowed the farm to match the application of organic manures to the field/crop nutrient need. At Aucheneck it was possible to reduce inputs of inorganic fertilisers. This in itself provides a number of benefits.

- Reduces over-application of nutrients to high status soils
- Targets areas with low nutrient status to improve soil status and yields
- Saves money
- Reduces risk of diffuse pollution

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 analysis should be carried out every 3-5 years.

Getting a nutrient balance is essential: over applying nitrogen fertilisers is costly, 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.

Campbell 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.

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

## Useful Information

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