

Soil and Nutrient Network



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Helping farmers improve soil and nutrient management

Case study - Crumhaugh Farm, South Lanarkshire

Three meetings of the Lanarkshire Soil and Nutrient Network Farm have been held at Crumhaugh Farm by kind permission of the Baillie Family .

Crumhaugh farm, sits between Stonehouse and Strathaven in South Lanarkshire is a 252 acre dairy unit run by the Baillie family.

The farm is run in conjunction with the Baillie's other holding Over Dalsersf. A new dairy unit was constructed at Crumhaugh in 2014; all dairy cows are now milked there with young stock being reared at Over Dalsersf. There is 115 acres cut twice for silage, 31 acres cut then grazed, plus 50 acres of winter triticale grown for wholecrop.

Soil types on the farm range from very light alluvial soils alongside the Avon Water to heavy clay loams. The majority of the soils are Sorn series with areas of Darvel, Drongan and Rowanhill. These soils are noted as imperfectly draining.

Over the course of the three meetings a variety of topics were covering including improving soil structure, making the most of slurry and manure, benefits of GPS soil sampling and fertiliser calculations.



Top tips from Crumhaugh

- Soil analysis is key to improving productivity, optimising fertiliser applications and improving output.
- Assess soil structure in fields, compaction can be present at different depths depending on the cause and this can be affecting productivity of the field.
- Use SAC Technical notes to calculate crop requirement, nutrients applied from slurry and manure in order to calculate your fertiliser requirements.

For more information on the Soil and Nutrient Network see www.farmingandwaterscotland.org. For dates of SNN events, find us on Facebook or follow us on Twitter @FarmWaterScot.



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Fertiliser calculations

The final meeting held focussed on how to carry out a nutrient budget and calculating fertiliser requirements taking into consideration soil status and slurry and manure applications.

SAC Technical notes were used by the group to work out crop need, calculate the available nutrients in their slurry then work out how much more bagged fertiliser was required.

It was shown that in 1 cut silage systems with moderate levels of soil P & K an application of 3,000gallon/acre applied by shallow injection in the spring is sufficient to meet crop need for Phosphate and 80% of the K therefore greatly reducing the quantity of fertiliser applied from the bag.

It was also demonstrated how it is often easier to meet crop requirements applying straights rather than compound fertilisers. Often, when a compound is applied there has to be a compromise with some nutrients being under or over supplied.

Straights vs. Compound

An area of 64 hectares of grassland used for cutting and grazing had been soil tested

Using the figures already calculated for nutrients requirements after slurry was taken into account, a fertiliser recommendation was prepared. Straight fertilisers, that is Muriate Of Potash (MOP, 0-0-60), Triple Super Phosphate (TSP,0-46-0) and Ammonium Nitrate (AN, 34.5-0-0) were used. A Nitrogen Sulphur blend, Extran S (29-0-0+15S) was selected as a source of sulphur.

A summary of the amounts required is shown in the table below:

Fertiliser	Extran S	AN	TSP	MOP
Amount re-quired (tonnes)	35.1	9.0	4.2	3.3
£/tonne	230	246	287	230
Total cost	8,063	2,213	1,207	865
			TOTAL	£12,348

The amount of fertiliser required was then calculated using only Multicut S (23-4-13 +7S) and using nitrogen required to steer the recommendation. This would simulate a situation where slurry had been analysed but soil sampling had not been done and it was assumed P and K in slurry would be sufficient.

Fertiliser	Multicut S
Amount required (tonnes)	58.6
£/tonne	274
Total cost	£16,056

So using straight fertiliser and soil testing initially saves **£3,708**. Using only Multicut S also caused a deficiency of sulphur (430kg) and excesses of P (1.8 t) and K (7.1 t). The excess P would be leached away causing an environmental issue and the excess K would cause luxury uptake in the grass which could lead to hypomagnesia in cattle grazing.

For Crumhaugh to switch to straights for their cutting system requires an extra 15 passes over the ground. Assuming contract fertiliser spreading is on average £12.50/ha fields would need to exceed 20ha in size before the cost of the additional passes outweighed the savings made from using straights.

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Key Improvements made at Crumhaugh

At the first meeting a test hole discovered compaction in the soil at the plough layer, this was preventing efficient drainage in the field. A layer of straw from where manure had been ploughed down was also clearly visible indicating the poor anaerobic conditions in the soil. Following the meeting this field was aerated using a flat lift sward lifter to break up the compacted layer.

Gavin was amazed at the difference this made to the field “This was only a 3 year old ley which we knew wasn’t performing as well as it should be, it lay in water for a lot of the winter. Sward-lifting the field made a huge difference and the field was noticeably drier through the summer and gave a hugely increased yield of silage”

Taking consideration of the nutrient value of slurry was also a key improvement at Crumhaugh with calculations at the first meeting demonstrating that up to £1000/year could be saved by altering fertiliser applications.



Digestate

With increased availability the use of digestate as a cheap source of nutrients has increased. Top Tips to consider when using digestate were covered at the meetings

- Nutrients should be accounted for in the same way as any other fertiliser.
- Ensure the material is PAS110 accredited or else a waste exemption will be required.
- An up to date analysis should be obtained from the supplier.
- As with slurry digestate should not be applied to frozen, snow covered or water logged ground.
- It is not permitted to mix digestate in a store with slurry.

Value your nutrients

The Slurry store at Crumhaugh was calculated to hold the equivalent of:

- 13t of Ammonium Nitrate
- 9.8t of Triple Super Phosphate
- 20t of Muriate of Potash

In monetary value this is around £10,575.



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Lessons taken from Crumhaugh

Following on from the Soil and Nutrient Network farm meetings at Crumhaugh farm we caught up with two of the regular attendees to see how they have changed their practices following the meetings.

Graham Mackie (30) farms alongside his parents at Westerboard Farm near Kilsyth. Graham attended the meetings at Crumhaugh over the two years of the project.

Graham said “Even though a lot of the information was things we learnt at College it was amazing how much of it I had forgotten. Following the first meeting we carried out soil sampling at home and were surprised at how low the pH was, we have put lime on to rectify this and are starting to notice a difference in grass yields”



Following the meetings Graham has carried out more soil analysis and used this and slurry samples to calculate his fertiliser requirements for the year ahead.

Previous high applications of slurry in the fields around the house has meant a moderate soil status for P & K was found when sampled. This has allowed savings to be made on fertiliser with applications only required to replace offtake rather than to build reserves.

Robert Parkin (29) farms along with his father at Higher Daviesdykes farm, Newmains.

“In the past we have struggled with storage capacity on the farm which has meant we have not been able to take advantage of the nutrients in the slurry as much as we would have liked, we have recently increased capacity meaning we can now spread slurry at times when the grass can take it up. I have been surprised at how much fertiliser we can actually save by taking into account the nutrient content of the slurry”

Robert’s recent soil analysis shows a variation across fields which he would previously have treated the same. From 3 fields sampled, one requires lime and the other two are low in both phosphate and potash.

“Previously we would have applied the same slurry and fertiliser to all of your silage fields however knowing the soil results is going to let us target the fertiliser better”

Normally a 22:6:8 fertiliser would be applied at around 501kg/ha (4cwt/acre) to the silage fields in addition to 3500gallon of slurry. In fields of even moderate soil status this is over applying phosphate and under supplying potash. Following attending the meetings Robert is going to trial using straights. In fields where soil status is low for P & K he will be applying 440kg/ha (3.5cwt) of the 22:6:8 and topping up the levels of K with straight Muriate of potash.

Matching fertiliser to crop need and slurry applications can help improve crops yields, soil status as well as saving money on fertiliser.

