

Saving money feeding a crop—nutrient budgeting



National Advice Hub
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What is it?

A nutrient budget balances the nutrient applied from products such as organic manures and inorganic fertilisers to the crop requirement, crop off take and soil nutrient status. Factors that influence the crop requirements are soil type, previous cropping history, annual rainfall, and the intended crop market.

Why is it important

Nutrient budgeting will ensure applications of nutrients made for crop and soil requirements prevent available nutrients becoming deficient or in excess which can lead to poor crop yields, quality, and loss of profit margin.

Where to start

The best way to start is to take soil samples. Yes, this will cost money typically £20 per sample but in comparison to fertiliser, fuel, machinery, and potential crop yield reduction it is extremely cost effective. .

The more recent the soil sample the more accurate the nutrient budget will be and fields should be sampled every 3-5 years, more frequently for higher value crops. The basic routine sample test will provide enough information for a nutrient budget with P, K, Mg, and soil pH included. Finer details are also provided such as calcium to magnesium ratio, extractable calcium, and sodium but the biggest gains and savings come from getting soil pH, P, K and Mg applications correct.

Soil P an K status explained.

VL = Very low level status means a considerable amount of extra nutrients will be needed for a successful crop or it may show chronic deficiencies which can reduce yield or cause crop failure. The status needs to be raised with one of the most economical ways being the application of organic manures however fertiliser can be used.

L = Low level status means extra nutrient applications will be needed to bring the status up, organic manure applications are still more economical than fertiliser, but it is realistic to be able to increase the status through consistent higher fertiliser applications.

M- = Moderate minus status means that for most cereal, grass, oilseed rape and fodder crops no extra nutrients will need to be applied and only crop offtake will need to be replaced. Potatoes and other responsive vegetables may still need extra nutrient applications.

M+ = Moderate plus means for all cereal, grass, oilseed rape, fodder, Potatoes, and other responsive vegetables crops no additional nutrients apart from crop offtake will be needed.

H = High status means that for all cereal, grass, oilseed rape, fodder, Potatoes, and other responsive vegetables crops nutrient applications can be reduced below crop offtake. Advice should be taken before committing to under applying.



Cropping Plan

A cropping plan details the previous crop type, previous crop offtake (straw), expected yield and the intended cropping market e.g, malting barley. Cropping plans can and do change depending on weather and ground conditions but having a cropping plan together can make forward planning easier.

Sources of nutrients available

What nutrients do you have available?

- Arable farms with no stock may only have bagged fertilisers available. Can you do a straw for dung deal or purchase organic manures such as henpen or compost. Could it be more cost effective to chop all the straw reducing crop off take?
- Livestock farms - what manures do you produce and in what quantity? Do you produce enough or are you in the correct locality to have straw for dung deal?
- Mixed farms growing crops and keeping livestock - do you have the ability to reduce bought in fertiliser through using manures more efficiently. Is the nutrient value of these manure being taken into account?
- Fertilisers – what has already been purchased and what is currently in store?
- Other material – do you have any anaerobic digestors in the area offering digestate? Can treated sewage cake/sludge or compost be source locally? An analysis of the nutrient value should be provided from the supplier.



Measuring quantities of FYM and Slurries

- Ideally every load should be weighed over a weighbridge or the trailer/spreader should have onboard weigh scales but, the vast majority of farms don't have this facility. Finding a public weighbridge and weighing one load could help to get a better understanding of the quantity being applied.
- Keeping a note of how much straw is used and what stock have been housed and for how long can also help estimate manure production.
- Counting the number of tankers loads it takes to empty slurry stores, the number and class of animals being housed can also help the accuracy of the liquid manure stock take.
- Tables are available in the Farm Management Handbook 2021/22 outlining manure outputs from different stocks classes .

Calculating the amount of organic manure produced can be difficult but it will give you more accurate information when bringing the budget together.

Advice

Seeking the advice of a FACTS trained advisor is advised but the information required to prepare a nutrient budget can be found in the SAC technical notes (TN). The technical notes are freely available from the farm advisory service (FAS) website, www.fas.scot.



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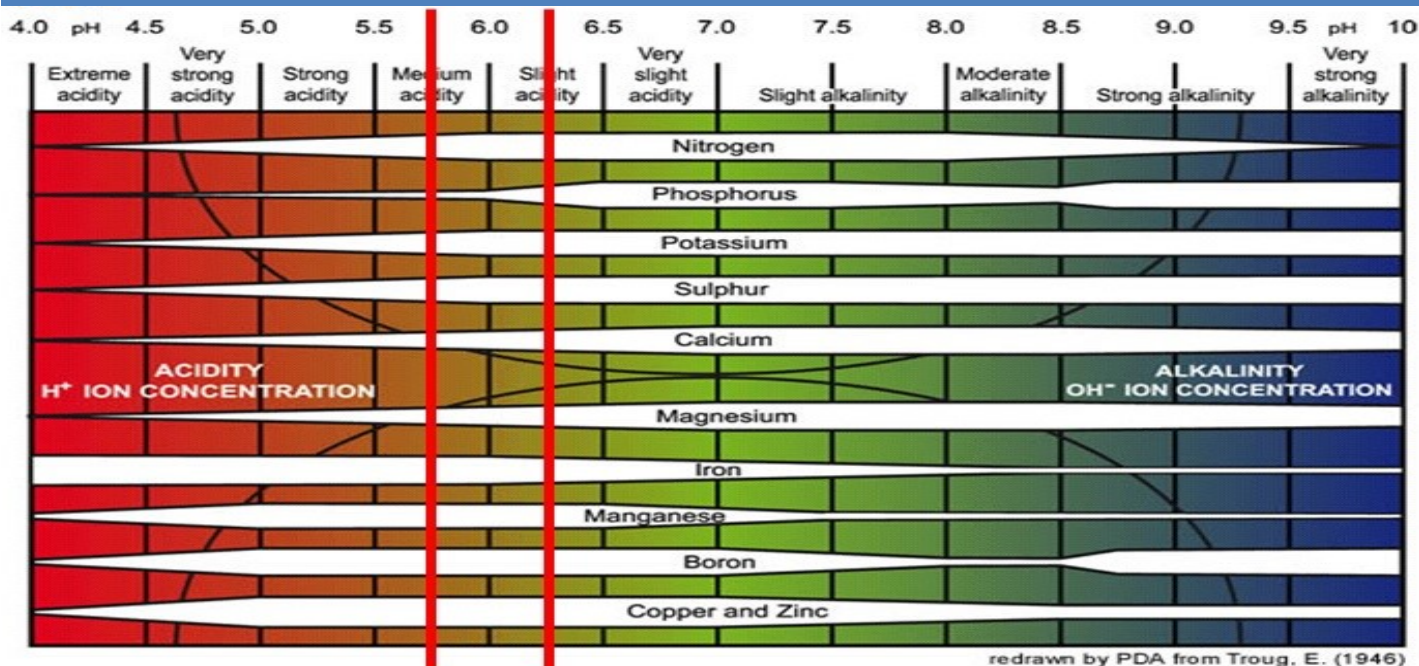
The main technical notes to use are;

- TN731 - Nitrogen recommendations for cereals, oilseed rape and potatoes.
- TN736 - Optimising the application of livestock farmyard manure and slurries.
- TN726 - Fertiliser recommendations for grassland.
- TN699 - Agricultural use of biosolids, composts, anaerobic digestates and other industrial organic fertilisers.
- TN718 - Phosphate and potash recommendations in Fife, Lothian, and Scottish borders (different TN available for other areas of Scotland).
- TN714 - Liming materials and recommendations.

Familiarising yourself with these technical notes will make you more aware of nutrients required for crop production allowing you to ask the right questions to your FACTS trained advisor or agronomist.

Liming plan

Within the nutrient budget a liming plan should be made to focus on fields that need attention. The general rule of thumb is that the pH target for cereals is 6.2 and for established grassland is 5.8. Stock farms that re-seed leys on regular basis should be aiming for a pH of 6 to ensure the leys have the best chance of good establishment. Maintaining soil pH is vital to ensuring that nutrients within the soil are available to the plants. The table below illustrates this.



The European Agricultural Fund
for Rural Development
Europe investing in rural areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

Savings example

In a **4 ha** field if potash fertiliser costing £1.14per/kg (£683/t) is spread at 10kgs/ha above crop need it would cost **£45.60** (4ha x 10kgs = 40kgs. 40kgs x £1.14 = **£45.60**). If a soil sample had been taken (£20/sample) and the correct amount applied, then a **£6.40/ha** saving could be made. (**£45.60** -£20 sample cost = £25.60 / 4ha = **£6.40**)

Compromising

A good nutrient budget is a flexible plan which will sometimes require compromise. It must be realistic to the limitations of the farming practice, availability/cost of products and the accuracy of their application.

- Applying straight fertilisers such as nitrogen, triple super phosphate (TSP) and muriate of potash (MOP) make applying exactly what is needed easier, but this is additional cost and time required for the extra applications.
- Blends and compound NPK fertilisers can save time and crop passes but nutrients may be under or over applied.

The compromise may be using a compound but working to the lowest nutrient amount needed for N, P or K then topping up with straights. The same principal can be used when applying organic manures, a wheat crop for example could receive 10t/ha or 25t/acre of FYM then have straight fertilisers applied to fine tune nutrient applications.

Useful Links and other information

- Farm Advisory service website - <https://www.fas.sc>
- Nutrient Planning & Fertilisers - <https://www.fas.scot/crops-soils/soils/nutrient-planning-useful-resources/>
- Access to free technical notes - <https://www.fas.scot/crops-soils/soils/nutrient-planning-useful-resources/>

Key Messages

- Sampling — get your soil tested to baseline soil nutrient requirements
- Measure — knowing the yield of crops and quantity of manures will ensure accuracy of your plan
- Compromise — nutrient budgets need to be adaptable and reviewed annually