

Nutrient Budgeting II - Getting started Practical Guide



To generate reliable crop nutrient recommendations the following factors need to be accounted for:

| For Grassland | For arable cropping |
|--|-------------------------------|
| Average April-September rainfall (mm) | Previous crop |
| Soil texture | Soil texture |
| Grass management, number and type of defoliations. | Crop market and yield |
| Soil P and K status | Soil P and K status |
| Grass yield | Winter rainfall (1 Oct—1 Mar) |
| | Straw incorporation |

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Accounting for organic manures

Organic manures are a great source of nutrients. Before planning inorganic fertiliser purchases, organic manures should be accounted for.

To assess the nutrient value produced by livestock, SRUC Technical Note TN650 has a list of standard figures for N, P₂O₅ and K₂O production for different grazing and non-grazing livestock types. It is always worthwhile sampling and testing organic manures as nutrient content can vary dependant on source, diet and length of storage. Alternatively TN650 details typical dry matter and nutrient contents of livestock manure.

To work out the quantity of organic manures produced from housed livestock, you can use PLANET software which uses standard manure production figures per head of livestock. Once the total quantity and analysis of organic manures produced is known then application rates can be calculated towards meeting crop requirements.

The availability of N within manure will depend upon many factors including length of storage, method of spreading, time to incorporation, timing of application and soil type. Tables in TN650 detail these figures. PLANET software will also calculate this information. Once the applications of organic manures have been planned and quantities on the farm are known, you can then plan purchases of inorganic fertilisers to make up the difference.



Websites

www.farmingforabetterclimate.org

www.fas.scot/ (contains Technical Notes)

www.agrecalc.com

www.gov.scot/Topics/farmingrural/Agriculture/Environment/NVZintro/NVZGuidanceforFarmers.



Scottish Government
Riaghaltas na h-Alba
gov.scot



Grassland fertiliser recommendations

When calculating a nutrient budget, nitrogen requirement is worked out separately from phosphate and potash. Optimum N application rate is based upon an assessment of the site class which is determined by soil type, average April to September rainfall (mm) and the grass management system.

When this information is known, SRUC Technical Note TN652 or nutrient budgeting software such as PLANET will give a site class. Dependant upon site class, a maximum total annual N recommendation in kg/ha will be detailed based on number of silage cuts or grazing defoliations and the level of clover in the sward. This is then split into separate applications based on sequences of defoliation.

To budget for phosphate and potash, soil P & K status and yield of grass offtake/ha is required. TN652 has a list of standard grass offtakes which have been calculated over a range of site classes. When multiplied by yield, the P & K offtake can be worked out. The fertiliser recommendation can be adjusted based on soil P & K status. The fertiliser recommendations are just a guide, so it would be worth discussing with your local agricultural consultant.



Arable fertiliser recommendations

Like grassland nutrient budgeting, nitrogen requirement is calculated separately from phosphate and potash. Technical Note TN651 details the nitrogen requirement for cereals, oilseed rape and potatoes. Cereal crop nitrogen requirements are calculated based on crop, previous crop, soil type with various adjustments to be made dependent on market, yield or winter rainfall. If located within an NVZ, it is important to calculate the Nmax of the crop and understand the various requirements which need to be justified if adjustments over the Nmax are to be used.

To work out nitrogen requirement for a crop, the previous crop group needs to be known—this information is all contained within TN651 or via PLANET Scotland. The soil type will dictate the level of N required; for example in mineral soils of low organic matter the residual N will be less than that of a peaty or humus soil.

Some markets such as milling for winter wheat will require higher nitrogen application and low N malting in spring barley will require less N than feed. The N recommendations are calculated at a standard yield detailed in the technical note. If higher than standard yield can be demonstrated on the farm it may be permissible to increase N applications by a given amount. As part of the NVZ rules you need to be able to prove higher than standard yield with three years of harvest records.

Phosphate and potash calculations are very similar to that of grassland calculations. Technical Note TN633 details the standard P & K offtake per tonne of grain harvested. Target status for cereal crops for P is moderate and for K is the lower half of moderate m(-). The offtake values are based on standard yields of grain per ha accounting for whether or not straw is removed. If baled, assumptions for straw yield are made within the grain + straw yield offtake figures. If yield is higher than the standard yield you must multiply the offtake of P & K per tonne by the yield per ha. Once this has been calculated, a correction must be made for the soil P & K status of the field. These figures are detailed in the technical note.

For potatoes, N requirement is again based on the previous crop. Potato varieties are also grouped based on haulm longevity. A list of groups are detailed in TN651. Once the previous group and variety group are calculated, a recommendation is given based upon the market and length of growing season which is measured from the number of days from 50% emergence to haulm death. P & K recommendations are detailed in TN633 accounting for soil status and intended market. Target status in potatoes for P & K are the upper half of moderate m(+).

Getting the most out of nutrient budgeting

Nutrient budgeting is an ongoing process and needs to be closely followed and tweaked if financial savings are to be made. When you have a fertiliser requirement for each field and have decided based on crop need and soil status where organic manures are to be spread, you will need to work out how much purchased fertiliser is required for the farm for the growing year. Decisions should be made based on individual farms as to whether it is best to apply straights or compounds and timing of applications should be considered to target individual crop growth stages.

Once a plan has been made and timings estimated then you may be able to take delivery as and when fertiliser is required, improving cash flow and reducing the need to have large stock piles of fertiliser for the full growing season. By using PLANET software, many of the mentioned recommendations can be generated. PLANET also has the ability to flag up potential cross compliance issues within NVZ regulations.