INTEGRATE FERTILISER AND MANURE NUTRIENT SUPPLY

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Description

- Use a recognised fertiliser recommendation system (e.g. UK RB209, France Phumus and other supplementary guidance) to make full allowance of the nutrients applied in manures and reduce mineral fertiliser inputs accordingly.
- Use manure analysis to gain a better understanding of nutrient applications and supply.
- Keep records of mineral fertiliser and organic manure inputs to individual fields.
- Farmers should be qualified in fertiliser application and nutrient management or use a professionally-qualified adviser.

Rationale, mechanism of action

Robust recommendation systems can be used to provide a good estimate of the amount of nutrients supplied by manure applications. This information can then be used to determine the amount and ideal timing of additional mineral fertiliser required by the crop. Farmers do not always allow for the nutrients in applied manure when calculating fertiliser rates [1]. In most cases, making proper allowance for the nutrients in manures will result in a reduction in fertiliser inputs compared with current practice and a concomitant reduction in nitrate and P losses.

Applicability

Most applicable to intensive grassland and arable systems, but also relevant to extensive grassland systems where breeding ewes are brought onto more fertile low-lying ground in late autumn to early winter. The method is effective wherever mineral fertilisers are used to top-up the nutrients supplied in organic manures.

Effectiveness, including certainty

For nitrate, the effectiveness (averaged over the farm area) is widely variable according to soil type, land use and the amount of manure used on farm. For a dominantly arable farm with manures on sandy soils, effectiveness can range from 2-20% [2]. For a livestock farm (mainly grassland) on clay loam soils, the effectiveness can range from 0.1-5% [2].

For P, the UK DWPA User Manual estimates that on a clay loam soil, the manure and fertiliser component of the baseline loss is reduced by 4%. The method is likely to have a greater long-term effect through avoiding the build-up of unnecessarily high P concentrations in the soil [3]. However, as for most (if not all) mitigation options, the effectiveness will depend on the baseline situation. Farm systems where manures are regularly applied to sandy soils on sloping land, and where no account is taken of the nutrient content of those manures will have the greatest potential to reduce losses, provided that alternative fields are available for manure spreading.

Time frame

The amount of nutrient is reduced at source. Mineral fertiliser applications are reduced to no more than is required for optimum economic production levels and to maintain adequate levels in the soil. The amount of nitrate in solution is optimised

throughout the crop cycle. For nitrate, notable benefits are found in the autumn when the system is prone to nitrate leaching over winter. However, where manures are regularly applied, nitrate losses can potentially be high, whatever the fertilizer policy. Where soil P levels are satisfactory (i.e. soil Olsen P content of 16-25 mg/l) manure phosphate inputs will generally supply the needs of the next crop, but long-term manure applications can lead to a build up of soil P reserves and increased losses with sediment and potentially in solution.

Environmental side-effects / pollution swapping
When slurry is spread too soon after the application of N fertilisers, there is a risk of increased nitrous oxide emissions through the process of denitrification. Current advice is to leave at least 5 days between applications of N fertiliser and slurry to the same field.

Relevance, potential for targeting, administrative handling, control
The method could be easily implemented *via* advice, education and guidance. Particular guidance is required with soil and manure sampling, on-farm analysis of manure, and interpretation of results.

Costs: investment, labor
This option will save money in artificial fertiliser nutrients not applied. However, if the previous policy was to not apply phosphatic and potassium fertilisers on a regular basis, thereby allowing nutrient reserves to run down, it may involve an initial increase in fertiliser costs. Nevertheless, in the long term there will be cost savings.

References
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[3] Cuttle, S., Macleod, C., Chadwick, D., Scholefield, D., Haygarth, P., Newell-Price, P., Harris, D., Shepherd, M., Chambers, B. & Humphrey, R. (2006) An Inventory of Methods to Control Diffuse Water Pollution from Agriculture (DWPA) USER MANUAL. Defra report, project ES0203, 115 pp. p. 43-44 http://www.cost869.alterra.nl/UK_Manual.pdf