

Best Practice Information Sheet

Nutrient management

Sheet 31.0a

Manure and slurry nutrient testing

Why change?

Livestock manure and slurry contain valuable nutrients. Good nutrient management makes the most of these resources, minimises application of mineral fertilisers and reduces nutrient losses. By realising the nutrient content of the manures and slurry on your farm, you can benefit from:

- cost savings due to decreased inputs of mineral fertilisers
- improved crop yields and quality
- reduced risk of watercourse pollution
- improved soil fertility and structure
- improved habitat and fishery quality.



Manure & slurry contain valuable nutrients

Steps to success

- 1. Review the current situation** by examining your awareness of the nutrient status of the manures and slurry on your farm. Look at the nature and frequency of your nutrient testing programme, and the extent to which you account for manure and slurry nutrient reserves when assessing levels of supplementary fertiliser inputs.
- 2. Identify potential opportunities** for an improved programme of manure and slurry nutrient testing on your farm. If you assess the nutrient content of manures and slurry regularly and include their value in your nutrient management plans, you could benefit from reduced inputs, save money and protect the environment.
- 3. Calculate the cost-benefit of these opportunities** by estimating the cost of testing the nutrient content of manures and slurry on your farm, e.g. use of standard values, on-farm testing kit, and laboratory analysis, versus the savings from reduced use of supplementary mineral fertilisers.
- 4. Develop an action plan** for making the most of nutrients in manures and slurry:
 - sample and analyse the nutrient content and availability of manures and slurries used on the farm, or use standard values
 - use standard values for general planning purposes. Be aware that these are based on analysis of a large number of samples, and may differ from the actual values on your farm due to farm-specific feeding and manure handling practices. Standard values are published in the **Fertiliser Recommendations** handbook Defra RB209
 - use sampling and laboratory analysis to provide more reliable guidance. Sample at least twice a year and aim to coincide with the main spreading periods. Collect multiple sub-samples to provide a representative 'average' sample for analysis. Be aware that if sampling does not follow recommended methods then the sample will not be representative of manures/slurries being applied and the analysis can be misleading.
 - laboratory analysis should include dry matter (DM), total N, P, K, S, Mg and ammonium-N (N readily available to crops). In addition, well-composted FYM and poultry manures should be analysed for nitrate-N and uric acid N respectively
 - for slurries, supplement laboratory results by using on-farm 'rapid' N meter measurements of ammonium-N, and a slurry hydrometer to estimate DM, as well as total N and total P content
 - use manure and slurry nutrient data to determine supplementary mineral fertiliser needs by calculating the nutrient requirement of the crop, and subtracting the nutrient values in manures and slurry plus the soil nutrient reserves.
 - if you farm in a Nitrate Vulnerable Zone (NVZ) follow the guidance booklets for manure and slurry applications and calculations.
- 5. Check** the nutrient content of manures and slurry that is *available* to the crop after the *total* nutrient content has been established. Available nutrient content will vary according to soil type, application timing and technique, autumn/winter rainfall following application, ammonia-N and nitrate-N losses, and mineralisation of organic N.

Nutrient management

Sheet 31.0b

Manure and slurry nutrient testing - Practical examples

Sampling manures and slurry for analysis

The composition of solid manure in a heap can vary depending on the amount of bedding and losses of nutrients during storage. Similarly, the nutrient content of slurry can vary considerably within a store due to settlement and crusting. Take several sub-samples to provide an 'average'.

Solid manures

- Take at least 10 sub-samples of about 1kg each. Place them on a clean, dry tray or sheet. Mix the sub-samples and take a 2kg sample for analysis
- For manure heaps, take the sub-samples from holes about 0.5m deep dug into the heap, or from the face of the heap at various stages during spreading
- For weeping wall stores, only take the sub-samples from the face of the heap after emptying has commenced.

Slurries

- Take at least five sub-samples of about 2 litres each. Pour them into a large container, stir thoroughly and take a 2-litre sample for analysis
- For above ground stores, if the slurry is fully agitated, take sub-samples from the reception pit. Alternatively, use a weighted 2-litre container attached to a rope from a range of positions from an operator's platform. This latter method can also be used for a below-ground pit
- For earth-banked lagoons, take sub-samples from the slurry tanker or irrigator if the slurry has been well agitated. Sub-samples can also be taken direct from the lagoon if a secure operator's platform is present.

Manure nutrient testing pays

In this example, manure from a 100 cow dairy herd, which was housed all year, was tested and spread at the correct rate and time. It provided an available nutrient benefit worth over £42/cow/year.

The cost of the nutrient testing kit (undertaken by the farmer) was £500 equivalent to £50/year for 10 years. Cost of laboratory testing is £70/year.

One cow produces 14.6 tonnes of manure/year. The available nutrients per tonne of manure are 1.7 kg N, 2.0 kg P and 4.6 kg K. The average prices of inorganic fertilisers are £0.55/kg N, £0.40/kg P and £0.36/kg K. The annual value per cow is £42, a total of £4200 for the herd.

MANNER software for calculating nitrogen availability in manures is freely available (www.adas.co.uk).

Payback is in less than a year.



N meter and slurry hydrometer

Remember

- Know the nutrient content of manures and slurry on your farm to reduce your supplementary mineral fertiliser use, improve your soils, save money and protect the environment.
- Avoid pollution. Do not spread within 10m of watercourses or within 2m of field margins.
- Do not apply more than 250kg/ha of total N in livestock manures or other organic wastes in any year.
- Observe mandatory guidelines for application of manures and slurry if your farm lies within a NVZ. NVZ and cross compliance helpline 0845 345 1302

For further information: Defra (www.defra.gov.uk), Environment Agency (www.environment-agency.gov.uk), ECSFDI (<http://www.defra.gov.uk/foodfarm/landmanage/water/csf/delivery-initiative.htm>), Natural England (www.naturalengland.org.uk), Cross Compliance Helpline 0845 345 1302 (www.crosscompliance.org.uk) and ART (www.associationofrivertrusts.org.uk)



This information sheet is part of a series providing farmers with advice on land management practices to protect water bodies, produced by Association of Rivers Trusts with support from the England Catchment Sensitive Farming Delivery Initiative. The advice will also enable farmers to use farm resources more efficiently and help meet Nitrate Vulnerable Zone and Soil Protection Review requirements under Cross Compliance and environmental regulation.



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