

### Step 3: What are you getting from organic manures?

Organic manures contain fertiliser nutrients and their value to the crop and your pocket must be considered. You will need to calculate the useful nutrients applied in organic manures so that you can deduct these from the total crop requirement.

So the more nutrients you can get from organic manures, the less you are likely to need from fertilisers. Not all of the nutrients applied in organic manures are available to the crop in the year of application. You will need to determine total nutrients and then calculate the crop available nutrients applied.

There are published tables for the typical total and available nutrient contents of organic manures<sup>1</sup>. You will need to have some information:

#### Manure information

- If FYM, period stored
- Dry-matter content (if possible)
- Soil type of the field(s) that manure is to be applied to
- Month of application
- Method of application
- Intended rate of application
- Time between application and incorporation (if broadcast)

#### Manures Checklist

- Do you have tables of standard nutrient contents in manures?
- Have you calculated how much N is available to the crop
- Do you know the capacity of your muck spreader<sup>8</sup>?
- If sampling slurry, can you do this safely?

Instead of using standard tables, you can take samples of manures and have them analysed to show nutrient contents (but you will still need tables or MANNER-NPK<sup>7</sup> for crop available N).

#### NVZ Check!

- Check you comply with the FIELD organic manure N limit (250 kg total N/ha in any 12 months) and the FARM livestock manure N limit (170 kg N/ha in a calendar year unless a derogation is applied for)
- Check you comply with closed periods
- Make sure you use the statutory available N values from NVZ Guidance when you are calculating the N<sub>max</sub> for crops grown<sup>6</sup>.

### Step 4: Calculate fertiliser needed after deducting nutrients from organic manures



#### Use these rules:

Always deduct the crop available N to adjust fertiliser rates

- If soil Index is 0 or 1 for P or K or the crop is especially responsive (e.g. potatoes), deduct the available P<sub>2</sub>O<sub>5</sub> or K<sub>2</sub>O from crop requirement
- If soil Index is 2 or higher for P or K and the crop is not especially responsive, deduct the total P<sub>2</sub>O<sub>5</sub> or K<sub>2</sub>O from crop requirement.
- Aim to maintain P and K Indices of 2 and 2 - respectively (for most crops). This may mean gradually running down or building up soil nutrient supplies.

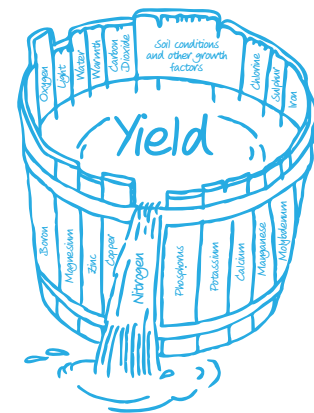
*Heaps of manure must occupy as small a surface area as is required to support the mass and prevent it from collapse. They must not give rise to free drainage from within the stacked material.*

#### Spreading Tips

- Apply fertilisers and organic manures evenly
- Keep spreaders well maintained and in good condition
- Tray test fertiliser spreaders every year and calibrate each spring and whenever the type of fertiliser is changed<sup>9</sup>
- Whenever possible target fields with lower P and K Indices for spreading organic manures
- Avoid watercourses
- Keep records

### Remember the law of the minimum

The capacity of a barrel with unequal staves is limited by the shortest stave. The same principle applies to all nutrients and factors influencing crop growth. Yield is limited by the nutrient in shortest supply.



#### Also available FREE from Tried & Tested:

- Nutrient management plan
- A3 record sheets
- Think Manures
- USB memory sticks containing electronic versions of all Tried & Tested tools, Think Soils, AHDB Nutrient Management Guide (RB209), NVZ guidance and other useful resources

Telephone: 02476 858 896

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Web: [www.nutrientmanagement.org](http://www.nutrientmanagement.org)

#### References

- 1 AHDB Nutrient Management Guide (RB209) available from [www.nutrientmanagement.org](http://www.nutrientmanagement.org)
  - 2 Tried & Tested Nutrient Management Plan [www.nutrientmanagement.org](http://www.nutrientmanagement.org)
  - 3 Tried & Tested SNS Calculator from [www.nutrientmanagement.org](http://www.nutrientmanagement.org) under 'What We Do' then 'Calculators and Estimators'
  - 4 The Potash Development Association: Leaflet 24, "Soil Analysis: key to nutrient management planning" available from [www.pda.org.uk/pda\\_leaflets/24-soil-analysis-key-to-nutrient-management-planning/](http://www.pda.org.uk/pda_leaflets/24-soil-analysis-key-to-nutrient-management-planning/)
  - 5 'Guidance on complying with the rules for Nitrate Vulnerable Zones in England available from [www.gov.uk/government/collections/nitrate-vulnerable-zones](http://www.gov.uk/government/collections/nitrate-vulnerable-zones)
  - 6 MANNER-NPK is a decision support system that can be used to accurately predict the fertiliser nitrogen value of organic manures on a field specific basis [www.planet4farmers.co.uk](http://www.planet4farmers.co.uk)
  - 7 The Tried & Tested 'Manure Capacity of Spreader' estimator available from [www.nutrientmanagement.org](http://www.nutrientmanagement.org) under 'What We Do' then 'Calculators and Estimators'
  - 8 AIC's "Fertiliser Spreaders – choosing, maintaining and using" available from [www.nutrientmanagement.org](http://www.nutrientmanagement.org) under 'Library' then 'Agricultural Industries Confederation'
- SEE ALSO a list of soil laboratories from [www.nutrientmanagement.org](http://www.nutrientmanagement.org) under 'What We Do' then 'Support and Advice'



## What is a Nutrient Management Plan?

A field nutrient management plan aims to match nutrient inputs (fertilisers and organic manures) to crop demand so yield is optimised, nutrient use is minimised and there are minimum losses of nutrients to the environment.

### Benefits

- Best value from fertilisers and organic manures used
- Enhanced crop yield and quality
- Reduced environmental risks due to field losses of excess nutrients
- Potential cost savings when all nutrient inputs are accounted for
- Improved crop and livestock performance from a balanced supply of nutrients

## Getting started

The principle of nutrient management planning is straightforward:



Crop requirement depends on field conditions and can be found in published tables eg *AHDB Nutrient Management Guide (RB209)*. Nutrient contents of organic manures also are available in published tables<sup>1</sup> or can be found by analysing samples. If you are new to nutrient planning you may wish to talk through your nutrient use with a FACTS Qualified Adviser<sup>2</sup> or follow the Tried & Tested Nutrient Management Plan<sup>3</sup>.

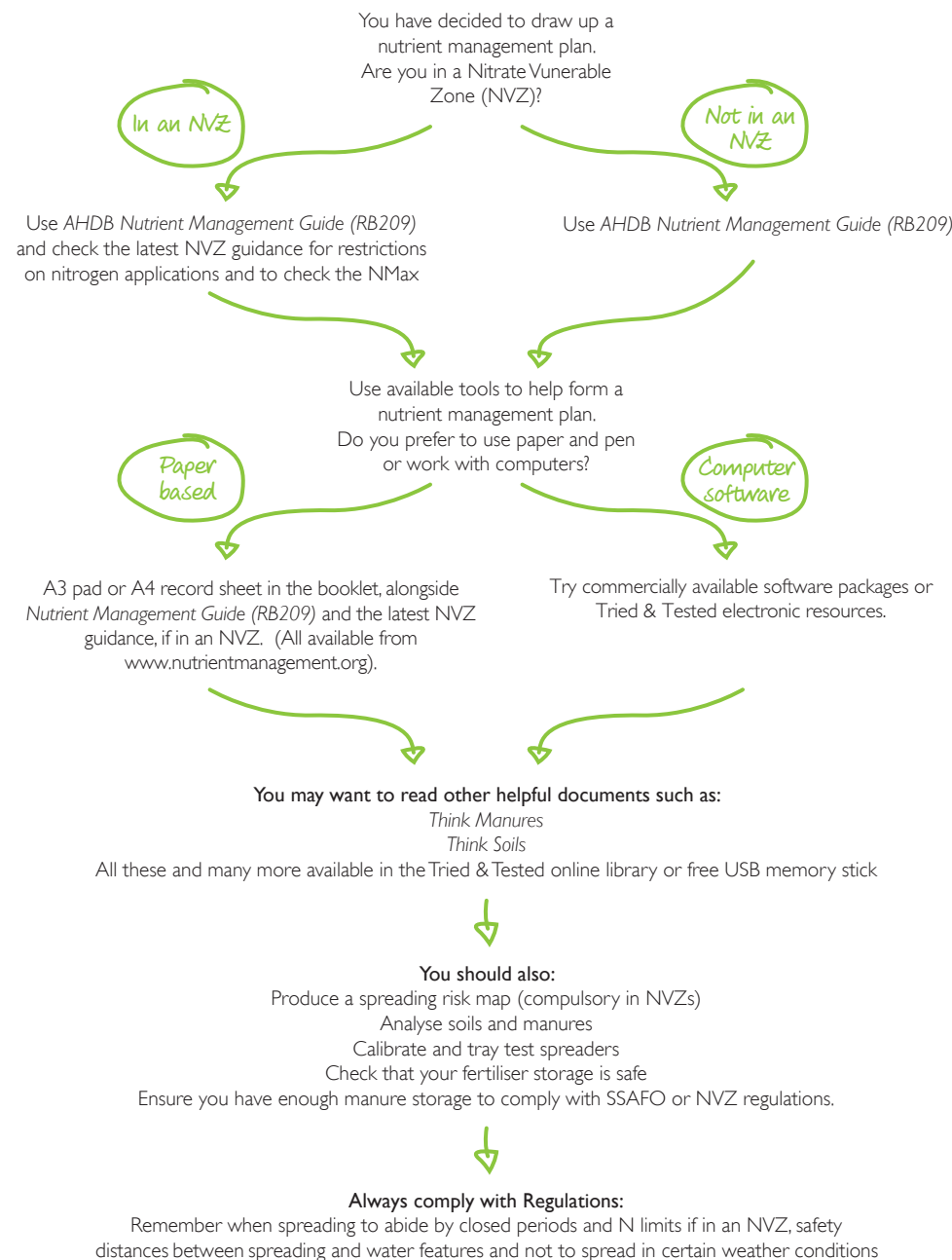
*including soil supply + organic manures (livestock manures, sewage sludge, digestate, compost, industrial waste)*

## How to do it

There are four key steps in nutrient planning:

1. Determine the supply of nutrients from the soil
2. Look up crop nutrient requirement at that level of soil supply
3. Estimate the supply of nutrients from any organic manures applied
4. Deduct the estimated manure nutrient supply from crop requirement to find the amount of fertiliser to apply

If you don't apply organic manures, you need follow only steps 1 and 2.



## Step 1: What are you getting from the soil?

The soil can provide part of the nutrient supply for the crop. The level of soil supply is shown by Indices (eg. 0-6 for N, P, K and Mg). The higher the Index, the less fertiliser is needed.

### Nitrogen (N)

- The amount of nitrogen supplied by the soil is **not** measured using standard soil testing but can be estimated from: Previous cropping, Soil type, Rainfall and Historic nitrogen inputs (including nitrogen applied in organic manures).
- The Tried & Tested SNS Calculator<sup>4</sup> or published tables<sup>1</sup> show the Soil Nitrogen Supply (SNS) Index (0-6) for these different conditions.
- Alternatively, the SNS Index can be found by specialised soil sampling and analysis.<sup>1</sup> This is more costly but might be suitable where there has been a history of organic manure applications and the soil N supply is large and not easily predicted.

### Phosphorus (P), Potassium (K), and Magnesium (Mg)

- Measured by soil sampling<sup>5</sup>
- Shown as an Index. Target Indices for grass and arable are Index 2 for P and Index 2- for K

### P, K and Mg Checklist

- Are recent (within 3-5 years) soil analysis reports available (if not, take soil samples for routine analysis)?
- What are the P, K, Mg Indices?
- Is the pH suitable for planned crop?<sup>1</sup>

### N Checklist

- Do you know the cropping history of the field (previous year if in arable production, previous three years if in grassland)?
- Have you assessed predominant soil type?
- Do you know local average annual rainfall?
- Do you know how much nitrogen has historically been applied to the field?

*you need this information to make use of published tables such as those in Fertiliser Manual*

## Step 2: What does the crop need?

Nutrient requirement varies with type of crop, expected yield and market. Once you know the Soil Indices, you can find crop nutrient requirement in tables of recommendations<sup>1</sup>. To use the tables, you'll also need to have some other information on the crop:

### Arable Crops and Forage Crops

- Crop type
- Expected yield
- Market
- Straw baled or incorporated

### Grassland

- Previous management and N use
- Soil type
- Summer rainfall

### Crop Requirement Checklist

- What crop is to be grown?
- What is the market for the crop?
- Is the planned crop suitable for the selected field?
- What is the expected yield?
- Will any straw be baled or incorporated?

If straw is baled and removed, it will take a lot of potash ( $K_2O$ ) and some phosphate ( $P_2O_5$ ) with it and these will have to be replaced. Higher yields will result in greater off take of nutrients. You should also consider:

- Is the intended crop suitable for the field (soil type, slope, rainfall)?
- Is the expected yield achievable? (rainfall, temperature, soil depth, disease, sward composition, previous experience).

Now look up crop nutrient requirements or if you are new to nutrient planning you may wish to talk through your nutrient use with a FACTS Qualified Adviser<sup>2</sup>.

Now you have the crop requirement for the field, and unless you will be applying organic manures, you can decide how and when to apply the fertiliser.

### NVZ Check!

Once you have decided how much N to apply to all fields of a crop (eg wheat), check you comply with Nmax requirement<sup>6</sup>.

If you will be applying organic manures (FYM, slurry, sewage sludge, compost, paper waste etc) to the field, go to the next step.