

## Soil fertility Management – 5 steps to follow

### 1. Soil test

A soil test will indicate the background soil fertility levels of pH, P and K and also Mg and trace elements where required. The role of soil analysis has taken on a new dimension in recent years within the Nitrates regulations, with soil testing now being associated more with bureaucracy and regulation than with good farming practice. However, it is important to remember that the primary function of soil testing on the farm should be to improve soil fertility information and to plan fertiliser applications.

Have soil samples taken for the whole farm. Unless you know what is in the soil, it is impossible to know how much fertiliser it needs. Therefore, by taking soil analysis and using the results, the fertiliser programme can be tailored to the needs of the soil and the farm. Repeating soil analysis over time is also critical to monitor soil fertility.

### 2. Apply Lime

Soil pH is the first thing to get right. The release of nutrients from the soil and the response to applied fertilisers will be reduced where the soil pH is low (or too high). Apply lime as required based on the soil test result to increase soil pH up to the target pH, which is 6.3 for grassland. It is important not to apply more than 3 t/acre of lime in a single application, as it can affect trace element availability in soils if applied in excess. Apply 3 t/acre immediately and the remainder after two years where more than 3 t/acre is required.

### 3. Target Index 3 for P and K

Soil analysis is designed to estimate the P and K that is present in the soil in a plant-available form. Aim to have soil P and K in Index 3 in all fields where high levels of production of quality grass is the target. High fertility soils (Index 4) are a resource and should be utilised. Low fertility soils (Index 1 or 2) need to be nourished. For soils in Index 3 the fertiliser program should be designed to replace the nutrients being removed, thus maintaining the soil fertility level. Advice for P and K for beef grassland is shown in Table 1. The P advice rates should also be adjusted to account for the P applied in slurry or coming onto the farm in concentrate feeds. Each tonne of concentrate feed is assumed to contribute 5 kg (10 units) of P.

**Table 1.** Simplified P & K requirements for grazing and silage in dairy and drystock systems.

Soil Index	Grazing for dairy cows Farm Stocking Rate (LU/acre)				Grazing for Cattle & Sheep Farm Stocking Rate (LU/acre)				P and K for silage (Add on to grazing rate)	
	< 0.8	0.8 - 1.0	> 1.0		< 0.6	0.6 - 0.8	> 0.8		First Cut	Second Cut
	P advice (units/acre)									
1	27	31	34		22	24	26		16	24
2	19	23	26		14	16	18		16	24
3	11	15	18		6	8	10		16	24
4	0	0	0		0	0	0		0	0
K advice (units/acre)										
1	72	76	80		56	60	64		96	156
2	48	52	56		32	36	40		96	156
3	24	28	32		8	12	16		96	156
4	0	0	0		0	0	0		0	0

#### 4. Slurry

Slurry is a valuable source of P and K, and typically contains 5 units of P and 30 units of K per 1,000 gallons. The P and K fertiliser values of slurry can be highly variable, usually due to dilution with water. While slurry can be more difficult to manage than chemical fertiliser, it can be a very cost effective resource to increase fertility levels. Target slurry applications to fields that have high P and K requirements (fields with P and K Index 1 or 2). Apply in cool and moist weather conditions (e.g. in spring) to maximise N recovery. Many beef farms with lower stocking rates will be able to import manures and slurries from other farms. Cattle and pig slurry brought into the farm is a cost effective way of increasing soil fertility and should be considered where possible.

#### 5. Fertiliser products that give a balanced nutrient supply

Make sure the fertiliser compound is supplying nutrients in the correct balance for the crop, the soil, and to complement other fertilisers being applied. If one nutrient is deficient, no amount of another nutrient will overcome this. For example, if a field is deficient in K, then excess N application will not be fully utilised. Consider straight K or NK fertilisers where P usage is restricted. Other nutrients such as Sulphur can play a very important role in a balanced fertiliser programme and should also be applied on lighter soils that are freely drained and have lower organic matter contents.