

Smart Farming

A Guide to Help Improve Farm Returns with Better Resource Management

Fertile soils are essential for grass and crop growth. These top tips will help you save money and protect the environment by better matching fertilizer and nutrient use with crop requirement.



Soil testing could save you up to €23/acre!



By soil testing, you can save €23/acre on fertilizer ¹

This is on land with high P and K levels (Index 4) and stocked at 2 dairy cows/ha (0.8cows/acre)

Consider soil testing at least every five years. It's an indicator of soil fertility levels.

Soil testing can save you money by identifying what parts of your farm have low fertility and need extra fertilizer to improve productivity. Soils with higher fertility need less fertilizers.

It will also help to plan fertilizer, slurry and manure spreading.



The annual cost of soil sampling is roughly 50 cents/acre/year ²

This is the same cost as 0.5 units/acre of P fertilizer

Apply lime - it could save you 2 bags/acre of CAN! ³

Low soil pH will result in:

- 1) lower availability of the nutrients in the soil, and
- 2) poorer response to applied fertilizers

Lime neutralises acidity in the soil and makes nutrients available to grow crops.

Spreading lime where required should be a priority after soil testing.

The soil test report will show a “lime requirement” result to indicate the rate of lime required to increase the soil pH to the correct level.

Optimum pH for grassland is 6.2-6.3 and tillage is 6.4-6.5.

Don't over lime. It can lead to trace element imbalances. Don't apply more than 7.5t/ha (3 t/acre) in a single application.

Avoid applying lime on fields with a lot of grass cover. After silage harvest or grazing is an ideal time to spread lime.

Lime can be spread all year round.

Building soils to Index 3 could be worth €180/acre⁴



Soils with P Index 3 will yield more grass DM than a soil in P Index 1. Approximately 0.6 t/acre (or 1.5t/ha)
This extra grass could be worth approximately €180/acre.

Soil Index 3 is the target soil fertility for grassland and most tillage crops.

Plan fertilizer and slurry applications so that all fields can be maintained in soil Index 3. Aim to replace the nutrients being removed in crops.

Know your soil index, so that the correct fertilizer rates can be applied.

The Soil Index System

What does “Soil Index” mean?

The soil Index system takes soil test results and simplifies them to show if a soil is either, low, medium or high in fertility for each nutrient. The soil test report shows the “soil Index” for each nutrient. The Index is given as a number: either 1, 2, 3 or 4.

Index	Description	Action required
1	Very low	Sub-optimal fertility.
2	Low	Apply fertilizers to increase soil fertility levels as well as to feed the grass or crop.
3	Medium	Optimum fertility level. Aim to maintain soil in Index 3. Apply fertilizers to replace the nutrients removed by crops or animal produce. Only approximately 25% of soils are currently in Index 3.
4	High	High fertility level. Soil has more nutrients than required to grow the crop. Additional fertilizers are usually not required, as the soil nutrients are sufficient to feed the crop. The risk of losses to water is also increased.

Index 1 and 2 soils (low fertility) will be underperforming and need to be improved by applying fertilizers.

Index 4 soils are a resource on your farm. Exploit them and save money on fertilizer.

A field might be Index 3 in one nutrient, but be low or high in another nutrient. Look at the requirements for each nutrient in each field individually.

Manures and slurry are valuable sources of nutrients.

€ Slurry spread efficiently could save you €27 per 1000 gallons

Think about the nutrient value of manures produced on the farm in terms of a 50kg bag of chemical fertilizer:

Manure type	Units			Value ⁵
	N	P	K	
Cattle slurry (1,000 gals)	6	5	38	€ 27
Soiled water (1,000 gals)	4	0.7	5	€ 5
Pig slurry (1,000 gals)	19	7	20	€ 27
Farmyard manure (1 tonne)	3	2.5	12	€ 10
Broiler litter (1 tonne)	11	12	24	€ 30
Spent mushroom compost (1 tonne)	3	5	18	€ 16



If you are spreading slurry – ask yourself:

“Would I be spreading bag fertilizer in this field if I wasn’t spreading slurry?”

If the answer is no, then the slurry is not saving you money on fertilizer!

Use slurry more effectively to save on fertilizer costs and to reduce losses to the environment.

Consider sourcing manures and slurry from other farms to save on fertilizer costs.



Spreading manure and slurry – Two Simple Questions:

1) Where to spread? 85% of the value of slurry comes from the P and K. Identify fields that have a requirement for the P and K in the manure/slurry.

2) When to spread? During the *open* season when losses of N to air are at their lowest (lower temperatures, moist weather). Spring is ideal!



Nitrogen availability in manures is highly affected by weather conditions in the 24 hours after application.



Target cool moist conditions to reduce nitrogen losses to the air. Aim for spring application. Cattle slurry applied in spring is worth €1.80 more per 1000 gallons than slurry spread in summer

Where feasible, band spreader, trailing shoe, and injection application methods also improve the N availability after application.

Use compound and straight fertilizers to balance requirements

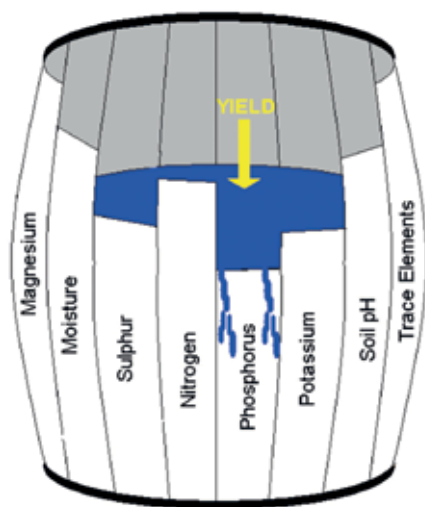
What is meant by a “compound” or “straight” fertilizer?



Compound fertilizers (also called NPK fertilizers) are mixtures of nutrients, usually N, P and K. The name of the compound reflects the % of N, P and K in the product. For example, 18-6-12 contains 18% N, 6% P, and 12% K. A 50 kg bag of 18-6-12 will supply 18 units of N, 6 units of P and 12 units of K.

Straight fertilizers contain only one nutrient. Examples include CAN (27% N), Urea (46% N) and Muriate of potash (50% K).

Fertilizers should supply nutrients in the correct balance for the crop and the soil fertility level



The grass or crop yield will be limited by the nutrient in the shortest supply. Excess application of one nutrient is wasteful if yield is being restricted by another nutrient and also increases the risk of runoff to water with the potential to cause water pollution.

Think of it as a barrel of water where each plank is a nutrient and the water level is the yield. The level of water can't get higher than the shortest plank in the barrel, no matter how high the other planks are!

Consider using a variety of fertilizer types that suit your farm. Straight chemical fertilizers may be more suitable than compounds in some circumstances.

For example, if a field is very high in soil P fertility, straight N and K fertilizers or a compound fertilizer with no P would be a good choice to meet the N and K requirements without spending on unnecessary P.

Remember fertilizer is not just a product in a bag!



Other sources of nutrients that can fertilise your grass and crops include nutrients in the soil, in manures and in slurry. These should be managed to ensure that all nutrients on the farm are recycled as efficiently as possible, and that the money you pay for chemical fertilizer is money well spent!

Footnotes

1. Soil tests could save €23/acre if a field is identified as being in Index 4. In the absence of a soil test, P and K advice at Index 3 for a sward grazed by dairy cows stocked at 2 LU/ha would be 11 units/acre of P and 24 units/acre of K. Based on a P and K fertilizer cost of €1/unit for P and €0.50/unit for K, the cost of applying the full P and K requirement at Index 3 would be €23/acre. At Index 4, no P and K are required therefore €23/acre could be saved. The potential savings are lower (€14/acre) on a drystock farm, as the P and K requirements are lower.
2. Soil tests will cost 50 cents/acre/year based on a cost of €25 per sample, for an average area of 10 acres per sample taken every 5 years.
3. Additional N is released from soils that are optimum pH compared to soils that are low pH and require lime. The additional N has been estimated to be over 50 units/acre/year. This is equivalent to approximately 2 bags/acre/year of CAN.
4. The grass DM yield potential of Index 1 soils is estimated to be 1.5 t/ha (0.6 t/acre) lower than soils in Index 3. Assuming that 1 tonne of grass DM can offset 1 tonne of concentrate feed costing approximately €300/t, the value of the extra grass grown in Index 3 compared to Index 1 could be worth €450/ha (= €180/acre).
5. The value of manures is based on the available nutrient content in each manure and the cost of chemical N P and K fertilizer. Values are calculated based on approximate chemical fertilizer costs for N (€0.60/unit), P (€1/unit), and K (€0.50/unit).