If necessary, soil test now

With prices for fertiliser nitrogen (N) and N-P-K blends more than double those of 12 months ago, it's essential to know the nutrient requirements of each field.

Mark Plunkett and David Wall
Teagasc, Crop, Environment and Land Use Programme, Johnstown Castle

Have you conducted soil analysis for your farm?

Conducting soil analysis is essential to gather the soil fertility information on each field or paddock on the farm. Soil analysis results will allow you to determine the right product, for the right place at the right rate and the right time for a specific farm.

This information is provided for a very small cost of just €1.25/ha (0.50c/ac) for soil sampling and analysis. This is a tiny fraction of the cost of chemical fertiliser.

Of the three major fertiliser nutrients, the increase in cost of N has been largest at ~€2.18/kg N currently, compared to ~0.85c/kg N, which is an increase of 140% since 12 months ago. The current cost of phosphorus (P) (€3.69/kg) and potassium (K) (€1.31/kg) have increased by 85% and 55%, respectively, over last season (prices at time of going to press).

By updating the soil analysis on your farm, areas where P and/or K savings can be made can be identified. Soils with high acidity (pH <6.3) can be targeted with lime applications to drive overall increased N, P and K use efficiency.

In a year with high fertiliser prices, minimising additional expenditure may be high on the agenda; however, it is critically important that soil fertility does not suffer as a consequence of misguided fertiliser use.

Do your soils require lime?

On receiving soil analysis results for your farm, the first area to assess is the soil pH levels and to identify where lime applications are required. A liming plan should be put in place to organise the delivery and application of lime when soil conditions are suitable over the coming weeks and months.

For example, correcting soil pH can help to release up to 70 kg N/ha/year and can unlock the stored P in soils and increase soil P fertility by up to one P Index (3 mg/l), thus reducing fertiliser P requirement by 10 to 20 kg/ha.

Tailoring P and K applications according to soil analysis results

Information to interpret the soil P and K index system is shown in table 1. The soil index system 1 to 4 represents the availability of P and K in the soil for grass production during the growing season. For example, at soil P or K Index 1 there is very low nutrient supply and the application of fertiliser P or K, will lead to a definite increase in grass growth.

Adjusting P & K applications in 2022

In 2022, with high compound fertiliser prices, it will be tempting to reduce fertiliser P and K applications to soils. However, such decisions should only be made on the back of soil analysis results being available for the different fields across the farm.

Soil P & K Index 1

Index 1 soils have a very low supply of P and K and are classed as deficient. These soils typically give the highest response in grass growth to applied fertilisers. Additional P and

Table 1. Soil P and K Index, response to fertilisers and corresponding soil analysis P and K ranges.

Soil P & K Index	Soil nutrient (P & K) supply	Grass growth response to applied fertilisers	Soil analysis P level (mg/l)	Soil analysis K level (mg/l)
1	Very low	Definite	0 – 3.0	0 – 50
2	Low	Likely	3.1 – 5.0	51 – 100
3	Adequate	Unlikely	5.1 – 8.0	101 – 150
4	Sufficient	None	>8.0	>150

Source: Wall and Plunkett 2020, Major and micro nutrient advice for productive agricultural crops, Teagasc Johnstown Castle.

K is required to build soil fertility levels to the optimum soil index 3.

In 2022, due to high fertiliser costs, aim to supply at least maintenance levels of P and K on these fields to maintain short-term productivity. Target organic manures to these hungry Index 1 soils to fully utilise the P and K in slurry.

Soil P & K Index 2

Index 2 soils have a low supply of P and K and grass response to applied nutrients is likely. These soils have a higher nutrient supply and will be able to sustain higher levels of grass production. On these soils apply at least the maintenance rate of P and K required to maximise grass growth during the season.

A lower level of additional P and K is also required to build up soil fertility for the future. For example, under a moderately stocked drystock system (beef, sheep, or dairy replacements), maintenance application rates of P and K on the grazing area could be applied for 2022 without compromising soil fertility.

Soil P and K Index 3

Index 3 soils have an adequate supply of P and K to sustain grass growth over the season. The aim of nutrient management planning for these soils is to replace the P and K removed in the produce such as meat, milk or grass silage.

Grazing livestock typically return 60% of the P and 90% of the K in dung and urine. Therefore, relatively small quantities of P and K overall are required to maintain soil fertility on these Index 3 soils. However, these rates need to be adjusted for the production system type and stocking rate.

On intensively grazed farms (eg dairy farms), a higher maintenance rate of P and K is required and caution should be applied when limiting P and K inputs during 2022 so that soil fertility does not suffer.

On lowly stocked drystock farms where grass demand is lower, there is more scope to reduce (50%) or even to omit fertiliser P and K applications for one year only, in order to reduce the impact of high fertiliser prices on overall farm profitability.

However, it will be very important to re-sample these fields in 2023 to monitor the effects of reducing or omitting P and K applications.

Soil P and K Index 4

Index 4 soils are very fertile, have a high nutrient supply and are not responsive to the application of P and K during the growing season. It may be prudent to make P and K savings on all fields with index 4 soils in 2022.

For P, omit applications for two to three years and then re-sample these soils to monitor changes in soil P levels.

For K omit for one year and revert to index 3 advice until soils are re-sampled. Apply straight N +S in the form of protected urea to balance crop N requirements.