

FOCUS

FERTILISERS



Fertilizer Association
of Ireland



INTRODUCTION

Remembering past lessons for future growth

This year, as fertiliser prices reach record levels, it has never been as important to get back to basics on soil fertility management. Use soil test results to help make decisions on the '4Rs' when applying nutrients – the right fertiliser product, targeted to the right field, at the right rate and the right time during the growing season will be critical for the year ahead.

Remembering this every time we plan fertiliser applications will ensure we get the greatest return for our investment.

While here in Ireland we are price takers with regard to fertiliser, there are many steps we can take to control and mitigate the high prices inside our farm gate.

In this year's supplement, we seek to understand where the high prices have come from, but also to examine the role fertilisers play in food production and their importance for global food security.

Asking the experts, we get their analysis on how fertiliser strategies must change in 2022 in response to the increased prices and in particular what this will mean for both grassland and tillage farmers.

New technologies will almost certainly play a part and on page 46, some key advances in fertiliser spreading technology and basics on fertiliser spreader calibration that we need to remember are explained.

What is evident from the information provided is that we have the knowledge and tools to make better decisions around fertiliser use in 2022. Remember the basics; soil test, lime as required (page 44) and use soil results to target fertiliser applications to where they are needed and maximise recovery.

Finally, can I remind readers that the Fertiliser Association of Ireland has many resources available to help you make better decisions around fertiliser use this coming season.

There are tools and information available on our website (www.fertiliser-assoc.ie/), or you can follow us on Facebook to see our advice on fertiliser and nutrient use during the year. There is also our P and K nutrient app, available for Android and Apple devices.

I would also like to wish all readers the very best success for the year ahead.



Timothy Sheil
Fertilizer
Association
of Ireland



Fertilizer Association of Ireland

Cattle slurry a valuable source of N, P and K

Mark Plunkett and David Wall from Teagasc Johnstown Castle take a look at the nutrients contained within cattle slurry

Cattle slurry is a valuable on-farm resource to reduce the impacts of high fertiliser prices. A number of farm practice changes may be required when making decisions to maximise the fertiliser value of cattle slurry, such as soil test results, time of application, application techniques (trailing shoe/band spreader) and rates of applications.

Targeted early application of cattle slurry based on soil test results will ensure efficient use of slurry P and K and improved N recovery rates. The typical value of 4.5m³ (1,000 gallons) of cattle slurry applied by low emission slurry spreading (LESS) in spring has an available N-P-K content equivalent to a 50kg bag of 9-5-32.

The nutrient content of cattle slurry may vary somewhat with animal type and diet, and especially with slurry dilution with water (see Table 2).

Knowing the nutrient content will help ensure that grassland receives the planned levels of N, P and K to maximise grass growth for either silage or grazing.

Laboratory analysis of slurry can be used to determine the nutrient values

for different slurries on the farm.

A more practical approach may be to estimate the slurry dry-matter on the farm using a slurry hydrometer. This is a low-cost and useful tool to estimate the N-P-K value based on the dry-matter after agitating the slurry.

Slurry phosphorus (P), potassium (K) and sulphur (S)

Cattle slurry is a good source of P and K fertiliser and should be applied to parts of the farm that have either low soil P or K levels, or to crops with high P and K demands such as grass/maize silage.

Targeting these areas will help reduce fertiliser bills and replenish soil P and K reserves. Research shows that fields around the farmyard tend to have higher levels of both P and K due to more regular applications of manures.

Silage fields tend to be the furthest away from the yard and often have low soil fertility levels, as well as the largest demand for both P and K.

The fertiliser replacement value of slurry has increased in line with increased fertiliser prices and the extra transport costs in moving slurry to



Cattle slurry contains varying amounts of N, K and P. \ Philip Doyle

fields further from the farmyard may offset the spreading charges associated with the longer transport distance.

Slurry is also a very well balanced fertiliser, as its P to K ratio is 1:6, which is ideal for grass silage crops. On grazing fields, the required P:K balance is 1:2 and pig slurry, for example, has a more suitable P:K ratio for grazing.

A suitable fertiliser compound for grazing would be N-P-K: 18-6-12 or equivalent. The P in organic manures such as cattle slurry is 100% available relative to chemical fertiliser when applied on soils at P index 3 status.

However, when applying on soil with P index 1 or 2 status, the availability of the P is assumed to be 50%. A soil test will confirm the P status of the soil and help with targeting slurry to index 1 and 2 soils for more efficient crop fertilisation and P utilisation.

Cattle slurry contains small amounts of S and continuous application will help build soils supply. For example, a typical application rate of 33m³/ha will supply around 1.0kg S/ha. For grass silage crops, ensure the fertiliser N+S type selected can also deliver between 15 to 20kg S/ha/cut.

Slurry nitrogen (N)

The form of N in cattle slurry is ammonium-N and is similar to the form of N that is made available in the soil after applying urea fertiliser. This form of N is readily available for plant uptake provided soil and weather conditions

are favourable.

Applying slurry in spring on cool, overcast or misty days will reduce N losses and maximise N recovery.

Using LESS technology (trailing shoe/band spreader) will further improve N recovery by up to 50%. For example, cattle slurry applied using LESS application methods will deliver an extra 0.35kg N/m³ (3 units N/1,000 gals) compared to the splash-plate application method.

Therefore, aim to apply as much slurry as possible in the spring by LESS in order to maximise slurry N value.

Spring-applied slurry using LESS is worth an additional 6 units of N per 1,000 gallons (worth an additional €6.50 per 1,000 gallons) compared with summer application of slurry by splash-plate, due to better N recovery at that time of the year (Table 1).

Dilution of cattle slurry will improve the N uptake, as the slurry will infiltrate faster into the soil compared to thick slurry. Diluted slurry can also be washed off the grass faster, resulting in reduced grass contamination.

Remember that dilution of slurry can help to increase the N efficiency when applying during dry weather, but will reduce the P and K content of the slurry and needs to be accounted for when balancing the crop P and K requirements. Typical cattle slurry has a dry matter (DM) of 6% and a nutrient profile of slurry according to dry matter is shown in Table 2.

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Table 1: Typical available N, P and K values kg/m³ for cattle slurry depending on application method

Time of application	N kg/m ³ (units/1,000gal)	P kg/m ³ (units/1,000gal)	K kg/m ³ (units/1,000gal)	€/m ³ ** (€/1,000gal)
Spring (LESS)	1.0 (9)	0.6 (5)	3.5 (32)	€8.7 (39)
Summer (Splashplate)	0.35 (3)	0.6 (5)	3.5 (32)	€7.3 (33)

*Cattle slurry value based on fertiliser N, P and K values in November, 2021

Table 2: Available N, P and K values of cattle at different dry matter (DM)% in spring by LESS application techniques

Dry matter % (Slurry description)	N kg/m ³ (units/1,000 gals)	P kg/m ³ (units/1,000gal)	K kg/m ³ (units/1,000gal)
2 (very dilute)	0.4 (4)	0.21 (2)	1.4 (13)
4 (watery)	0.7 (6)	0.35 (3)	2.1 (21)
6 (typical)	1.0 (9)	0.5 (5)	3.5 (32)
7 (thicker)	1.1 (10)	0.6 (6)	4.0 (36)

Note: On index 1 and 2 soils, reduce slurry P availability by 50% and reduce K availability by 10%.

Buying fertiliser: options and strategies for the grassland farmer

Peter Ging, Goulding Fertilisers, and Gavin McGowan, Target Fertilisers, look at the options for dealing with record high fertiliser prices on grassland farms

The cost of production of fertiliser is heavily reliant on natural gas price, especially for the production of nitrogen (N) fertilisers such as CAN and urea. During the 2021 season, European gas prices rose by up to 1,000%. This had a direct effect on the final fertiliser cost, as CAN and urea have seen a 280% increase compared to the same period last year.

For N-P-K fertilisers, a similar trend has been seen with costs increases of MOP (Muriate of Potash) and DAP (Di-Ammonium Phosphate) also increasing due to restrictions on exports from countries such as China and sanctions imposed on countries such as Belarus.

However, it's not all bad news. Even at these high prices, there is still an economic return for farmers when spreading N fertiliser to grow grass as feed for animals, compared to using more concentrate feed.

Farmers should look at options and strategies that they can control inside their farm gate.

Management practices

Do I have recent soil samples?

Use soil samples taken within the last three years as a basis for nutrient management decisions. Complete new soil samples if required. Consult a qualified adviser to interpret your soil results correctly and create a fertiliser plan for your farm for the season ahead.

Use the recent soil sample results to match fertiliser products to your soil nutrient needs and make significant cost savings where soil test results indicate index 4 and that no further nutrients are required.

Identify fields that have low soil fertility, such as P and K index 1 and 2, and aim to apply P and K as needed to maximise fertiliser N use efficiency and crop yield potential.

Have I applied lime where required recently?

Lime is the key component of soil fertility and should be applied when soil pH is low. When soil pH is within the optimum range of 6.3-7.0 for grassland or 6.5-7.0 for tillage crops, it can help to reduce potential N losses.

Lime will increase nutrient utilisation from fertilisers and organic ma-



Making use of lime and slurry will be essential in 2022. \ Houston Green

nures and will also help release additional mineralised N and P from soil reserves.

Slurry or urea fertiliser can be applied prior to liming soils, leaving 10 days between applications and then following with lime without increasing losses of N.

Select the correct lime type for your soils – either calcium or magnesium lime is available. With a soil pH correction from 5.5 to 6.3, an additional 1t of grass DM per hectare of grass at least can be produced annually.

How should I manage my slurry?

Slurry is a valuable nutrient source and targeting slurry applications to fields with the highest P and K requirement will help save money on the farm.

Silage fields typically have the highest nutrient requirement and cattle slurry can be used to deliver sufficient P and K at silage closing time.

Use the LESS (Low Emission Slurry Spreading) application method to increase the N utilisation from slurry. The trailing shoe slurry application method can also deliver up to a 60% increase in N availability from slurry applications compared to splash-plate.

Do I need to cull or sell underperforming animals?

With the higher cost of growing grass, more focus should be placed on keeping the farm stocking density under control.

Underperforming animals that lower the profitability of the system may need to be culled or sold. If extra grass is grown, this can be taken off as baled silage, which will be very valuable next winter.



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Technologies that improve farm sustainability

Fergal Maguire, Teagasc and Owen McPartland, Lakeland joint programme, report on the farm of Dermot Heaney, who is due to speak at the Fertilizer Association of Ireland annual seminar

Dermot and Catherine Heaney farm in Kilberry, Navan, Co Meath. Dermot runs a herd of 234 high-EBI crossbred spring-calving cows and followers. In total, Dermot farms 113ha, consisting of a 76ha free draining milking platform and 37ha out block which is situated five miles away.

Milk is supplied to Lakeland Dairies. In 2021, the herd delivered 483kg milk solid/cow (1,000kg MS/ha) on 931kg of a low protein ration. The dairy system is built on achieving high levels of grass utilisation.

In 2021, 38 grass measurements were completed, resulting in the grazing platform growing on average 13.3t/ha of grass dry matter and between 275-280 days grazing with the herd.

Dermot has placed a large emphasis on improving his soil fertility. "Continuous investment has been needed on the farm to improve the soil fertility status of the farm."

The percentage of the farm at optimum soil fertility (pH, P and K) has increased from 6% (2016) to 66% (2020).

The milking platform has optimum soil fertility, with any lime required be-

ing spread in 2021 and 100% of the area index 3 and 4 for P and K respectively.

With this, focus has diverted to improving the soil fertility status of the out block. Chemical nitrogen fertiliser usage was 247kg N/ha last year. Protected urea accounted for 41% of fertiliser usage.

"We have used protected urea for the last three seasons and are delighted with its performance," Dermot said.

Pasturebase records show the farm has a Nitrogen Use Efficiency (NUE) of 25%, with the best paddocks recording 39% NUE mainly due to the clover content of the sward.

Dermot invested in a Low-Emission Slurry Spreading (LESS) umbilical system in 2020.

"It gives us great flexibility with regard spreading the correct volumes in the correct weather conditions, while also reducing soil compaction. We have greater control of our slurry, which has become so valuable. Therefore, it is targeted to replace nutrient offtakes and for soil fertility build up," he said.

Recently, the farm has become part of the Teagasc Signpost Farm Programme.

"We are planning to test our slurry to determine its nutrient content and with targeted use we can reduce a proportion of our requirement for chemical nitrogen on the areas that receive slurry in that application," Dermot said.

In 2021, 5% of the farm was reseeded, and a further 6% had clover stitched into the swards. Being the first year of clover establishment on the farm, Der-



Dermot Heaney on his farm in Co Meath.

mot says it has been "a steep learning curve in the first year of incorporating and managing grass-clover swards."

"We reseeded in mid-June and the clover established excellently and received zero chemical nitrogen from the date of sowing. It has been grazed four times since establishment."

"We grazed these paddocks last in the final rotation to encourage clover development through letting light down into the sward."

He says the lessons learned from year one are that "both reseeding and stitching will have to take place earlier in the grazing season to avoid drought conditions. We will reduce the depth that the clover seed was sown at during stitching also."

Dermot has increased the EBI of his herd over the past number of years and recorded a herd EBI of €192 in 2021.

While breeding the herd's replacement stock, a strong focus is placed on high-EBI sires and previously, the gains that could be made by introducing Jer-

sey sires through hybrid vigour.

The breeding strategy in place has been a major contributor to reducing the carbon footprint of the milk supplied by 20% to 0.85kg CO₂/kg fat and protein corrected milk.

Improving farm sustainability is a key objective of Dermot's and he has highlighted a number of areas;

- Monitor and improve the financial performance of the farm.
- Improve and add to the high valued biodiversity areas on the farm.
- Use 100% protected urea as a straight N source.
- Reseed up to 10% of the farm per year incorporating both red and white clover.
- Continuing to over-sow specific paddocks with 2-3kg of white clover.
- Increase the nutrient use efficiency on the farm to 30%.

"We aim to continue to develop a farming system that is sustainable into the future from an environmental, economic and work-life perspective," he said.

Maximising nutrient use efficiency under changing legislation

Dymphna Kehoe, department of agriculture at Johnstown Castle, outlines how farmers can maximise nutrient use efficiency under changing legislation

Nutrient use efficiency is increasingly important in continuing to produce top-quality food in a sustainable manner, both economically and environmentally.

Agriculture relies on and influences the quality of our water. Although overall water quality in Ireland compares favourably to the EU average, meeting objectives under the Water Framework Directive, whereby all waterbodies achieve good status by

2027, will be challenging.

With some encouraging signs recently of water quality improvement in 20% of prioritised water bodies, the focus must be to prevent and reduce water pollution from nitrogen and phosphorus surpluses arising from agricultural activities. Farmers have a vital role to play in this.

The Irish agri-food strategy identifies the need to reduce nutrient losses to the environment and reduce chemical fertiliser use. It has set targets in line with the EU Farm to Fork

Strategy target of reducing nutrient losses by 50% by 2030 and a reduction in chemical fertiliser use of 20% by 2030.

Ireland's Nitrates Action Programme (NAP), which was first introduced in 2006, has a key role in achieving these targets.

The current fourth NAP has been extended until March 2022 and a draft fifth NAP has been published. This includes measures which will help Ireland to achieve the targets set out in the Irish agri-food strategy and assist Ireland in meeting its environmental targets.

The draft measures include a chemical fertiliser register which will be introduced from January 2023, a cut in chemical nitrogen allowances by 10%, along with extending the prohibited period for fertiliser

application by two weeks, a limit of 50kg organic N/ha for commonage with no chemical fertiliser allowed and further amendments to the nitrogen excretion figures, through the introduction of a banded system based on milk yield for dairy cows.

The nutrient value of organic fertiliser becomes more and more valuable as chemical fertiliser prices rise.

The management of organic fertilisers is vital in terms of increasing nutrient use efficiency and preventing nutrient losses to the environment. To reduce the impact of nutrient losses in the riskiest periods, it is proposed that all slurry must be applied by 8 October 2022 and by the earlier date of 1 October from 2023 onwards.



Nitrogen being applied to spring barley.

Additionally, a prohibition on the spreading of soiled water, during December will be in place by 2025, following a phased introduction starting in 2022 with a corresponding increase in storage requirement.

The compulsory use of Low Emission Slurry Storage (LESS) will be extended on a phased

basis to lower-intensity farms starting with farms stocked above 150kg N/ha from 2023. In addition, all organic manures applied to arable land must be by LESS or incorporated within 24 hours of application.

These measures will help to reduce nutrient losses to the environment but maintain vital nutrients on farms and reduce the need to apply expensive chemical fertilisers.

Overall, the proposed NAP measures will help Ireland to meet water quality targets but also more holistically will help Ireland to achieve its climate and biodiversity targets. The negotiations with the European Commission on the draft NAP are ongoing and are expected to be finalised in March.

Nitrogen options for tillage farmers to use in 2022

Dr Richie Hackett, Teagasc, Oak Park, looks at the options available to tillage farmers when applying nitrogen to winter and spring crops

High fertiliser N prices are causing concern for cereal growers. The main question is whether fertiliser N rates should be reduced and if so, by how much. The majority of growers should be reducing their N rates in 2022, but the amount is dependent on both fertiliser N cost and grain value.

The increased fertiliser N price is, to some extent, offset by the increase in grain price since early last season.

The breakeven ratio (BER), number of kilos of grain required to pay for one kilo of N, is commonly used to determine adjustments in N rates. Taking CAN at €675/t (€2.5/kg N) and grain at €220 (€0.22/kg) gives a BER of 11.4.

Normally, BER would be about 6. Higher BERs this season mean the N rates should be reduced, the adjustment being about 6kg N/ha for each unit change in BER above 6.

In this example, the normal N rate should be reduced by $5.4 \times 6 = 32\text{kg N/ha}$.

Recent Teagasc analysis suggests that the change in N rate per unit change in BER should be slightly higher than 6kg N/ha for winter wheat (6.5) and lower for barley (5).

In summary, N rates should be reduced by 25-35kg N/ha this year compared to normal and the calculated average yield loss as a result is 0.2t - 0.3t/ha.

The starting point should be the recommended rate given in the Teagasc Green book, not necessarily what a grower did in previous seasons.

This is a particularly important point for malting barley growers,

who typically use less N than would be recommended for yield in order to meet protein specifications, particularly those growing distilling barley. In many cases, malting barley growers should make much smaller reductions, if any, to their N inputs in 2022.

Urea, where it is available, has a lower cost per kg N. However, be mindful that some of the N in urea can be lost via volatilisation into the air under certain conditions.

This problem can be eliminated by

using protected urea. Urea also has a lower bulk density than CAN-type products, making it more difficult to spread evenly on wide trams, particularly in marginal spreading conditions - great care should be taken to ensure that your machine is properly set up to spread urea.

In order to maximise the efficiency of use, avoid applying N where crop demand is low or where the risk of loss is high.

Instead, focus N applications to

when N requirement is highest, which for cereals is during stem extension. Applications early in the season should be avoided or kept to a minimum amount.

In terms of splits, where greater than 150kg N/ha is to be applied, three splits are suggested.

A lot of research at Oak Park would indicate that any effects of altering the amounts applied at different splits is limited, so applying the same percentage reduction to all splits is suggested.



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With increased fertiliser costs, lime is more important than ever. \ Houston Green

Q&A

Eoin

O'Carroll, Grolime, and David Wall, Teagasc, Johnstown Castle, answer common questions on how to best manage lime application

Can lime be applied to grazing fields?

Yes, once fields have been grazed off and grass covers are low, it is an ideal time to apply lime. For example this could require ordering a load of lime (20t) after each grazing rotation to correct soil pH.

Where lime sticks to the grass, will it affect grazing animals?

Ideally, apply lime to low grass covers to reduce pasture contamination with lime. Rainfall will typically wash most of the lime from the grass down to the soil. Where a small amount of lime remains on the leaf, this will not affect grazing animals.

What is the best way to manage lime on soils that are prone to becoming soft at the surface

To minimise these effects apply lime on "a little and often basis" and improve soil pH in stages over time.

Don't exceed 5t/ha in a single application or apply split applications (2.5t/ha) over a number of years.

When should lime be applied to silage fields?

Leave sufficient time (~2 months in dry weather) between applying lime and closing for grass silage. This will enable the lime to be fully washed into the soil and reduce the risk of lime entering the silage bales or the silage pit.

How long should I leave between lime and slurry applications?

Spreading cattle slurry on fields that have received lime recently and where the lime

has not had sufficient time or rainfall to be washed into the soil, can result in a loss of some of the available N in the slurry. To minimise these slurry N losses, apply the slurry first and then apply the lime seven to 10 days later.

How long should I leave between lime and urea applications?

For urea, a similar situation arises to cattle slurry where increased N loss (ammonia-N volatilisation) may occur where straight urea fertiliser is applied on recently limed land. Therefore, apply urea first and apply the lime seven to 10 days later to reduce the risk of N losses. However, where protected urea is being applied, research work indicates that it is safe to apply protected urea to fields that have been limed recently.

What is the lime advice for high molybdenum soils?

Where farms are affected by high Mo soils aim to maintain soil pH between 6.0 and 6.2. Alternatively, apply lime as recommended and supplement animals with copper.

*In short

- Lime is used to correct the pH of the soil to bring it to optimum levels.
- Having the correct soil pH is essential to ensure healthy and active soil microbiology and to improve nutrient uptake of plants and crops.
- Soil pH reduces over time due to crop off-takes, rainfall and nitrogen fertiliser use.
- It's best to apply lime on a little and often basis.

How fast will lime work?

Once lime is applied and is washed in to the soil, it starts to adjust soil pH. At least 35% of ground limestone (350kg/t) has a particle size < 0.15mm and is very fast-acting.

The remaining 65% lime (650kg/t) provides a long-acting source of lime to neutralise soil acidity over time.

This courser fraction of lime will be broken down in the soil in the medium term

(six to 24 months) and helps to maintain soil pH levels in the longer term until the soils are resampled in years four to five.

What is the return on investment from lime?

Research shows that liming acidic soils increases grass production by 1.5tDM/ha.

On a drystock farm, this is valued at €105/t DM and €180/t DM on a dairy farm.

An application of 5t/ha of ground limestone to correct soil pH represents a cost of €25/ha/year over five years. The return on investment from lime gives €6 to €10 worth of extra grass for every €1 invested in lime.

What types of ground limestone are available?

There are two types of ground limestone that are available nationally – calcium and magnesium. Calcium lime is most widely available, while magnesium is only available in the southeast.

On soils that are low in Mg, magnesium limestone is a good source for both soil pH correction and to provide Mg for plant growth.

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Soil fertility sees a big improvement

Paddy Casey, Target Fertilisers, and John Clarke, Department of Agriculture, Food and the Marine, analyse fertiliser use trends in Ireland

While fertiliser sales in Ireland have steadily increased over the last decade, there are indications that this will change in 2022.

In late 2021, the impact of global supply and demand on fertiliser prices and, in turn, fertiliser sales was clear.

Due to rising prices, the demand for fertiliser earlier in the year increased significantly, as many farmers forward-bought.

Overall, sales of nitrogen (N) increased by 5.18% compared to 2020, while sales of

phosphorus (P) and potassium (K) increased by 4.09% and 4.16%, respectively, over the same period.

Prior to 2021 and with the exception of 2018, when drought conditions led to a fodder crisis resulting in an increased demand for fertiliser, growth of sales of fertiliser have been relatively modest over the last four years, indicating a leveling off in recent years.

5.18%
Increase in N sales on 2020

With fertiliser prices expected to remain high and with an increased focus on soil fertility, the efficient use of fertilisers and other organic manures, an overall reduction in fertiliser use is expected in 2022. It is expected that fertiliser will be purchased as required instead of forward-bought.

Table 1: Fertiliser nutrient sales in Ireland

Year	Nitrogen (N)	Phosphorus (P)	Potash (K)
2016	339,104	37,075	95,558
2017	369,089	41,893	108,694
2018	408,495	46,387	120,267
2019	367,364	42,672	114,288
2020	379,519	44,259	118,016
2021	399,164	46,068	122,922

Source: Department of Agriculture

Soil fertility improvements

Analyses of results from soil research from across all of the main soil-testing laboratories indicate a continuing positive trend with regard to improvement in overall soil fertility levels.

Soil pH has been improving over time, and results show less highly acidic soils with more soils within the optimal agronomic range of = 6.3.

The proportion of soils at the agronomic optimum of P Index =3 has been increasing since 2016.


The change in K levels has been less during this period, with the highest proportion of soils tested still at the sub-optimal index 2.

Both from an agronomic and environmental perspective the proportions of soils meeting the optimum criteria has increased since 2016.


Across all soils sampled in 2019, 23% had soil fertility levels capable of supplying nutrients for high levels of grass and crop production (pH =6.3 and P and K index =3), up from 14% in 2017. However, excluding soils at P Index 4, which have higher risk for P loss to water, the proportion of soils at both the agronomic and environmental optimum accounted for 13% of all soils sampled in 2019, up from 4.7% in 2017.



Sales of nitrogen fertiliser increased by 5% in 2021 but it remains to be seen how much of this is currently in stock on farms.
Donal O'Leary




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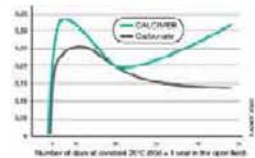
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Soil Health


- ✓ Optimised soil pH for soil biology and earthworms
- ✓ Porous nature of Calcimer® provides habitat for essential soil bacteria and fungi to flourish



Source of Calcium

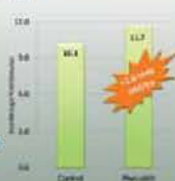
- ✓ Essential plant nutrient
- ✓ Soil structural benefits
- ✓ Balancer for high soil magnesium to improve soil structure

Soil

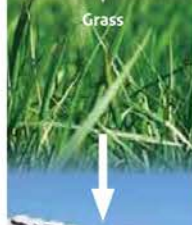


Grow & Use more Grass

- ✓ Higher grass yield
- ✓ Healthier swards and faster recovery after grazing
- ✓ 1.6 t/ha of additional DM measured in on-farm trials
- ✓ Unlocking upto 50kg of additional N from the soil reserves.




Grass



Nutrient Uptake

- ✓ Soil pH optimises nutrient availability in the soil and efficiency of fertilisers
- ✓ Root stimulant allows better nutrient uptake by the plant roots
- ✓ Natural source of trace elements
- ✓ Breakdown of organic matter and slurry to release nutrients

Animals



Grass Quality

- ✓ Nutritionally superior grass with higher Calcium and Phosphorus contents
- ✓ 13-18 % increase in P content
- ✓ 8-17 % increase in Ca content (On-farm grazing trials comparing mineral contents in grazed grass with or without physiolith application)

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Fertilizer Association of Ireland

Setting up the fertiliser spreader

Francis Quigley, Teagasc machinery specialist, outlines the steps to take to correctly set up your fertiliser spreader

With fertiliser prices at an all-time high, it is more important than ever to make sure that your fertiliser spreader is in top condition this season. What you can do to ensure your spreader is spreading evenly and accurately.

There are a few simple items that you should look at first. Check the spreader condition, look for any signs of rust or cracking in the frame and hopper itself. Any issues need to be fixed to ensure the spreader doesn't break when being filled or if you hit a bump on the road/field.

Make sure that the spreader is mounted correctly on the tractor. This should be checked with the machine at the working height. This is normally a disc height of around 70cm over the crop. However, check the operator's manual for your machine.

You need to make sure that the machine is level both left to right, and front to back. If not, you should check and adjust the tractor tyre pressure, lower the link arms and the topline to make it level.

Inspect the spreader vanes. Wear on the vanes will have a big impact on the spreader's performance. These are a wearing part so need to be replaced regularly.

Signs of wear are usually seen as waves or holes worn into the vanes. Any issue here will have a big effect on the spreader's performance.

It is very important to check the angle of the vanes. They will need to be adjusted to suit the fertiliser type that is being spread.

Most manufacturers have smartphone apps which make this process much more user-friendly than it used to be with the calibration booklets.

Also, while you are doing this, check for any wobble in the discs as the bearings will wear out over time and need replacing.

It is important to check the agitator in the bottom of the hopper. This has a very important role – it maintains a constant and even flow of fertiliser on to the disks.



Check that the vanes are in good working order.

If the agitator is broken or worn then the fertiliser will flow in stops and starts and result in very uneven spreading.

Check the shutters on both sides of the hopper. They need to open evenly.

If there is wear in the linkages or on the shutter itself then the openings in the hopper may be different. This will result in more fertiliser being released on to one of the discs and the spread pattern will be wrong as a result.

Check the flow rate of fertiliser. This is done by calibrating the spreader. Different fertilisers will flow at different rates, so the shutter position for 125kg/ha of urea will be different to the shutter position for 125kg/ha of CAN. This is done by removing one of the discs and placing a bucket under the shutter outlet.

Run the tractor PTO, then open the shutter for 30 seconds and collect the fertiliser in the bucket.

Check the amount collected against the fertiliser spreader app for your spreader.

If there is no app for your spreader, then you can use the Teagasc online cal-

culator to work out how much fertiliser should have been collected. Adjust the shutter position until the correct amount is reached.

Check the tractor forward speed and the PTO speed. These settings are critical to getting the application correct. If you are not sure how to do this, then ask the garage to calibrate the speed sensors when you get the tractor serviced.

If you have access to a set of trays, carry out a field tray test. This will tell you how even the fertiliser application is across the full bout width.

Basic GPS

A basic GPS guidance system is a very good investment for anyone spreading their own fertiliser.

The GPS unit will not only make sure you are driving at the correct working width. It will also give you an accurate forward speed reading.

If you have a headland or boundary spreading unit on the spreader, check to make sure that it is working correctly

and that the vanes are adjusted to suit the working width used.

It is important that the deflector is dropping to the correct level so that it diverts the fertiliser, but equally as important is that it retracts fully out of the way once the headland run is complete.

It is also important to check that lights and covers are all functioning correctly.

Check hydraulic hoses for leaks and make sure that all of the safety guards are in place. Aftercare of the spreader will ensure a much longer more accurate life of the machine.

Wash it down completely after use and lubricate all of the grease points. When storing for a prolonged period, apply a protective coating to reduce the chance of rust and corrosion.

ONLINE CALCULATOR
Scan the QR code to use the Teagasc online calculator to work out how much fertiliser should be collected.



Potassium plays key role in cereals and grassland

Kieran Holden, Origin Enterprises, and PJ O'Connor, Grassland Agro, look at the importance of potassium for cereals and grassland

Soil results provided by Teagasc in 2020 show that 52% of grassland at optimum nutrient levels of index 3 and an increase in the number of soils tested at index 1 and 2.

On tillage farms, a larger percentage of soils tested were at index 3 and 4 (66%) and a steady decline in soils testing at index 1 and 2 (34%).

In a year where nitrogen (N) prices have risen sharply, potassium (K) levels in soils are very important to maximise the efficiency of N applied. This is very important to make the most from every kilo of N applied. Potassium is an essential

nutrient for plants. It is one of the major three plant nutrients – nitrogen (N), phosphorus (P) and potassium (K) and is required in large amounts.

Potassium supply supports plant structural development and plays a key role in the uptake and efficient use of N. The functions of K are to:

- ➔ Increase root growth and nutrient uptake.
- ➔ Reduce plant lodging (cell wall strength).
- ➔ Movement of nutrients in the plant.
- ➔ Drought resistance.
- ➔ Increase plants tolerance to cereal plant diseases such as powdery mildew.

The aim is to maintain soil K levels at index 3 (101mg/l to 150mg/l) for optimum production.

For grassland fertiliser K, advice is based on soil analysis and use of the sward (grazing or silage).

Crops such as cereals grain yield is taken into account to determine crop K advice.

Advice for grassland

The K requirements for grazing are low as K is mainly recycled (90%) by animals in dung and urine. For grass silage, there can be large K off-takes depending on grass silage yields and number of cuts.

Advice for cereals

Cereal nutrient advice for K is based on maintaining the soils at the optimum level of index 3. Potassium advice is determined by soil analysis, crop type and the expected grain yield (t/ha).

Where soil test results are below index 3 additional K will be required for a number of years to build soil K levels.

Potassium off-takes

Potassium requirements can be calculated per tonne of grain yield. See Table 1. For example, 10t/ha crop winter wheat removes 98kgK/ha (grain and straw).

Table 1: Potassium (K) off-takes in cereal crops (kg/ha) per tonne of grain yield

Crop	Straw removed	Straw chopped
Winter wheat/barley	9.8	4.7
Spring wheat /barley	11.4	4.7
Oats	14.4	4.7

Where straw is chopped after harvest, crop K off-takes are reduced from 98kg K/ha to 47kg K/ha.

There is approximately a 50:50 split of K between grain and straw in cereal crops.

Where high-yielding crops are harvested each year, it is important to adjust the K advice to take account for high-

er K removals. This will help maintain soil K levels at the optimum soil K index 3.

Source: The Importance of Potassium (K) in Agricultural Soils, The Fertilizer Association of Ireland, in association with Teagasc Technical Bulletin Series - No. 5 February 2020.

Don't forget to apply sulphur in 2022

PJ O'Connor from Grassland Agro and Tim Sheil from J Bolger & Co advise on the importance of sulphur as a fertiliser

New research has been completed at Teagasc, Johnstown Castle, by Claire Aspel on sulphur (S) in grassland.

Sulphur is an essential plant nutrient and is vital for nitrogen use efficiency. Historically, it was found that there was a lot of S supplied from atmospheric deposition from heavy industry and pollution. However, this has reduced over the last number of decades and, as

a result, S deficiency is reappearing, especially on lighter-textured soils and it can occur in grassland (including silage) and tillage crops.

Sulphur is not reliably measured in a soil test and plant mineral analysis can be used to diagnose if visual deficiency symptoms are observed.

Treating a deficiency can be done by using an S-containing fertiliser. Using a nitrogen (N) + S fertiliser, NPK blend + S or a product such as sulphate of potash (K + S).

In a year where N prices are at record high levels, it is well worth ensuring that S is not limiting on your farm. In general, grassland should receive 15kg/ha per year of S (silage 15kg/ha to 20kg/ha of S per cut) and tillage crops 15kg/ha per year.



Sulphur is critical for plant yield.
Claire Nash

The Terra Product Range is manufactured by Target Fertilisers

Terra Range



AWARD-WINNING SUSTAINABLE FERTILISER SOLUTION FOR FARMERS



Improved Nitrogen Use Efficiency



Plant multi-level activity



Lower N required



Proven results



Natural product with no harmful residues

For more information visit targetfertilisers.com



News and updates online

The Fertilizer Association of Ireland (FAI) website www.fertilizer-assoc.ie provides the latest information on fertiliser best practice and advice across a wide range of areas.

This website's resources and information have been built up over the lifetime of the FAI. You will find an archive of technical bulletins and papers going back as far as the 1970s, as well as the most up-to-date content relating to topics that are currently

relevant. The website is a free resource, and we encourage you to avail of it to keep up to date with the events and information that the FAI offers.

The FAI's P and K calculator app for both iOS and Android provides general guidelines for crop offtake and/or general agronomic advice for P and K application to grassland and arable crops in Ireland.

It is free to download on Google Play and the Apple Store.

Soil science award for UCD student

Each year, the Fertilizer Association of Ireland presents a monetary prize to the student in UCD for excellence in their soil science exams. This year's recipient of the award was Ciara Fox, a dairy business student. The award was presented at the annual UCD School of Agriculture and Food Science awards ceremony.



Ciara Fox, soil science award recipient for 2021.