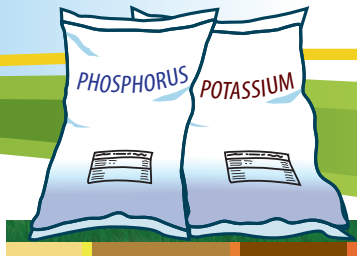
Soils, Nutrients and Fertiliser Factsheet

Managing Phosphorus (P) & Potassium (K)

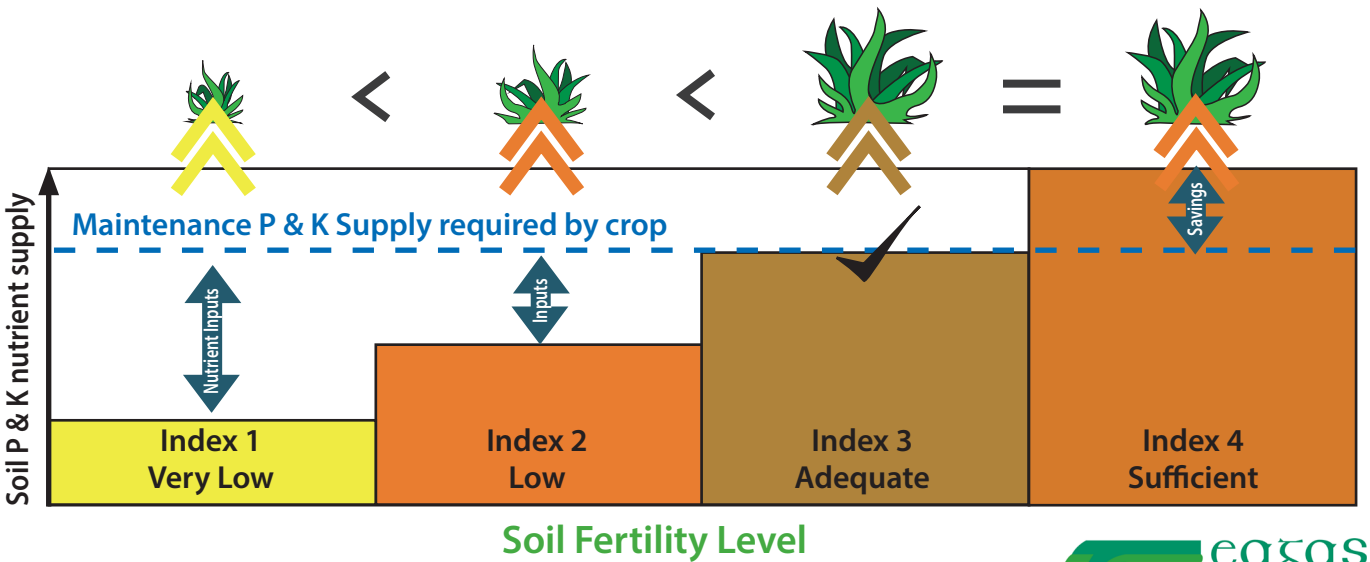


When N-P-K compound fertiliser prices are high, it will be tempting to reduce fertiliser P and K applications. Decisions should only be made based on soil analysis results. In the absence of soil analysis, one must assume soil fertility is at Index 3 and either too little (on Index 1 & 2) or too much (Index 4) P & K fertiliser could be applied, leading to a poor return on investment

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

Soil P & K Index	Soil nutrient (P & K) supply	Crop growth response to applied fertilisers	Grasslands soil analysis P level mg/l	Arable soil analysis P level mg/l	4 (kg/ha) mg/l
1	Very low	Definite	0 – 3.0	0 – 3.0	0 – 50
2	Low	Likely	3.1 – 5.0	3.1 – 6.0	51 – 100
3	Adequate	Unlikely	5.1 – 8.0	6.1 – 10.0	101 – 150
4	Sufficient	None	>8.0	>10.0	>150

Source: Wall and Plunkett (2020), Major and micro nutrient advice for productive agricultural crops, Teagasc Johnstown Castle.
Soil analysis index ranges are based on Morgan's Extractable P and K test



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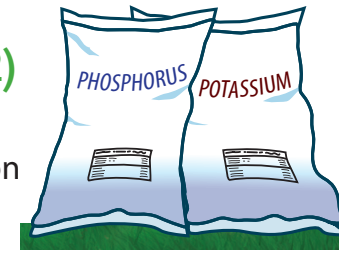
P & K fertiliser strategy on low fertility soils (Index 1&2)



The strategy to improve soil fertility on these soils is; firstly, to apply the P and K required to grow the crop during the season and secondly, an additional application of these nutrients is required to build-up soil fertility for future seasons

- At the very least, apply the recommended maintenance P & K rates to meet the crop growing needs during the season
- Target organic manures to these hungry Index 1&2 soils to fully utilise the P and K
- For moderately stocked systems (beef, sheep, or dairy replacements), maintenance application rates of P & K only on the grazing area could be applied in the short term without drastically compromising soil fertility
- Where it is planned to harvest silage or arable crops, it is essential to replenish the large crop P and K offtakes from the soil. Organic manure applications will help to supply the majority of the P and K requirements. A nutrient top-up with a suitable fertiliser compound will balance the N, P, K & S in line with crop demand

P & K fertiliser strategy on soils with optimum fertility (Index 3)

Index 3 soils have an adequate supply of P and K to sustain grass growth over the season. The fertiliser strategy for these soils is to replace P and K removed and to maintain the optimum soil fertility. Nitrogen use efficiency is also optimised when soil fertility levels are good (Index 3)

- Grazing livestock typically recycle 60% of the P and 90% of the K consumed in dung and urine. Relatively small quantities of P and K maintain fertility on these Index 3 soils
- Adjust the maintenance P and K application rates according to the farming system type (crop > dairy > dry-stock and accounting for difference in stocking rate)
- On a lowly stocked dry-stock farms (<130 kg/ha Organic N) where grass demand is lower, there may be more scope to reduce the maintenance rates (50%) of fertiliser P and K applications for one year only
- All fields where P and K applications were reduced or omitted should be re-sampled next year to monitor and react to changes in soil fertility

Soils with very high P & K fertility (Index 4)

It is prudent to make P and K savings on all fields with Index 4 soils

- Omit P applications for two to three years and re-sample to monitor changes in soil P levels
- Omit K applications for one year and either re-sample next year or revert to K Index 3 advice until soils are re-sampled
- Apply straight N & S in the form of protected urea to balance crop N & S requirements

Deirdre Hennessy, Seamus Kearney, Mark Plunkett, David Wall, Mark Moore (Editor), Pat Murphy, Stan Lalor, were the main contributors to this series of leaflets. Numerous colleagues from Teagasc AGRIP, CELUP, REDP, Signpost, PR dept. and advisory service also participated.

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