



The Potash
Development Association

POTASH



Some frequently asked questions about P and K.

Q: How much potash do I need to apply to raise my soil K Index to the target Index of 2-?

A: This depends on soil type. Heavy soils will require more potash than light soils. When less potash is applied than is removed the K Index on light soils will fall more quickly than on heavy soils. Research at Rothamsted suggests that on a sandy clay loam with a pH of 6.5 it requires about 10 kg/ha of potash (K₂O) to raise the soil K status by 1 mg/L. Thus to raise the soil Index from the middle of Index 1 to the middle of Index 2-, an increase of 60 mg/L, it would require about 600 kg/ha of potash, or a tonne/ha of muriate of potash (MOP, KCl). Heavier soils would require more – maybe 800 kg K₂O/ha, while light sands would require perhaps half as much. These amounts are in addition to the offtake of potash in the crop being grown of course.

The fertiliser which is required to correct a deficiency (i.e. to raise the soil K status to the top of Index 2- for example), should not be a financial responsibility/burden on the crop being grown. Each crop grown in each field should pay for the nutrients it removes from that field at harvest, but not for improvements in soil fertility – raising the soil K Index in this case. Correcting a potash (or phosphate) deficiency is an expense to improve a farm asset and should be accounted for as such. If a crop is required to pay for extra fertiliser to correct a soil deficiency, then the amount it can afford will be too small to make much difference in the short term. If an input of 600 kg/ha K₂O is required it would clearly take 10 years to correct the deficiency by applying an extra 60 kg K₂O/ha per year to the standard crop recommendation. Soil nutrient deficiencies are likely to affect yields and profitability as long as they persist so it is important that they are corrected as soon as possible to ensure that the risk of yield loss is minimised.

So if a P or K deficiency is shown up by soil analysis, it should ideally be tackled separately from the fertiliser policy for the crop(s) to be grown which is based on replacing the nutrients removed by the crop. Having identified a field or area which is deficient a strategy should be planned so that the fertiliser required to correct it can be applied over 2 or 3 years, with the cost being allocated centrally, as for liming etc. For example, if the soil contains 100 mg/litre K and it is decided to increase the level to 180 mg/litre sufficient potash must be added to achieve an increase of 80 mg/litre. If the soil is a medium clay loam, the quantity of potash required can be calculated, assuming that 10 kg K₂O/ha will increase soil K by 1 mg K/litre. These calculations can really only be made on the basis of the soil analysis value given by the laboratory in mg/litre or mg/kg; the soil Index value covers a wide range and is not sufficiently precise.

Index	Phosphorus mg/litre	Potassium mg/litre
0	0-9	0-60
1	10-15	61-120
2-	16-25	121-180
2+		181-240
3	26-45	241-400
4	46-70	401-600
5	71-100	601-900

Table 1: Relationship between soil analysis values in mg/litre (Olsen P and AN-exchangeable K) and Index numbers (for England, Wales and N Ireland).

Q: *How much phosphate is needed to raise a deficient soil to the middle of P Index 2?*

A: Exactly the same principles apply as those described above for potash, except that the quantity of phosphate required to raise a medium-bodied soil P by 1 mg Olsen P/litre is 50 kg P₂O₅/ha. Thus to raise a soil by 7.5 mg P/litre from the middle of P Index 1 (12.5 mg P/litre) to the target of the middle of Index 2 (20 mg P/litre) requires 7.5 x 50 = 375 kg P₂O₅/ha. This could be supplied by about 800 kg triple superphosphate, but such a large quantity should be applied over a period of at least 3 years. Because of environmental considerations the timing and method of application of each large dressing of phosphate must be managed carefully to ensure no surface run-off nor loss of P in flood-water. Each dressing should be spread carefully avoiding watercourses (ideally just before sowing) and worked into the soil without delay to minimise risk of loss.

Q: *How much potash am I adding if I incorporate the straw rather than bale it?*

A: No potash (nor phosphate) is added to the field when the straw is chopped and incorporated, it is just that none is removed. The potash (and phosphate) which is in the grain at harvest is removed and should be replaced to maintain the soil at the target Index. Potash and phosphate in the straw has been taken up from the soil by the growing crop and is put back when the straw is incorporated. The potash in the straw will be available for use by the following crop.

Q: *I missed an application of potash last year but will be applying it this year; that's OK isn't it?*

A: The soil reserve of potash will have been depleted by last year's harvest and this will not be made up by a normal application this year. If the soil K Index was in the upper half of Index 2 then probably all will be well (for most arable crops), but if the Index was already low – for example in Index 1 – then there is a high risk that this year's crop yield could be affected. Check the situation by soil analysis and incorporate the necessary fertiliser before sowing.

Q: *I farm on a light sandy soil. What is the best approach to potash manuring?*

A: Potash is retained in soil by being held on clay particles and organic matter; light soils usually contain little of either. This means that it is difficult to increase the soil K Index much above the border-line between K Index 1 and 2. In this case K should be applied annually for each crop with part of the dressing being applied in spring to winter-sown crops, perhaps as an NK dressing. The overall quantity of potash required will be that which is necessary to achieve the expected yield and to replace the amount removed at harvest.

Q: *I have a supply of manure. Is this a good source of potash?*

A: The potash content of manures can vary widely but the potash they contain is available to crops. Applying manures is a good way of increasing the K Index when this is less than the target value. When applying manures regularly use soil analysis to follow changes in the K status of the soil. Most of the potash excreted by animals is in the urine, so management of manures should ensure that this component is not lost.

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