



The Potash  
Development Association

# POTASH

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## Should P and K recommendations be affected by fertiliser prices?

The straight answer is 'No', and this Newsletter attempts to explain why. It may be stating the obvious, but phosphate and potash are not applied to make a crop grow, but to maintain the soil reserve of these nutrients at a level which ensures optimum yields and effective use of all other inputs, especially nitrogen. It is sometimes remarked that 'we did not see a response to added phosphate or potash'. This is a good observation, because it means that the soil had adequate reserves of these nutrients. If a response to P or K is seen, it is because the soil is deficient. You should not see a response in well-farmed situations!

The phosphate and potash removed from a field in harvested grain, seed, tubers, roots etc. can be calculated from the known yield and the amount of nutrient in a tonne of fresh harvested produce, as shown in PDA Leaflet 'Phosphate and Potash Removal by Crops' and also in Appendix 5 in RB209 ('MAFF' Fertiliser Recommendations book). If straw or other crop residue is removed the question arises about the quantity of nutrients to apply to replace those removed. If the grain yield is known but not the straw yield then the publications above give estimates of the total offtake in grain plus straw based on the grain yield. If the weight of straw removed is known then the nutrient content per tonne of straw can be used to calculate the amount removed and this can be added to the offtake in the grain to find the total quantity to be applied. None of these calculations is influenced by fertiliser price or the value of the crop.

Phosphate and potash recommendations are designed with two purposes:

- i) to ensure that the soil nutrient level is adequate and that there is no deficiency to limit the yield of the crop being grown, and
- ii) to replace the nutrients removed from the field in the harvested crop.

The first of these is managed through soil analysis. For a crop to reach full yield potential it is essential that the soil has sufficient reserves of phosphate and potash, which means keeping reserves at the target Index level shown in RB209. For arable crops the target is Index 2 for P and for K. Soils with reserves lower than this will usually give smaller yields, and should be corrected as soon as possible to minimise the number of growing seasons with reduced yields. Trials have shown that smaller yields on soils below the target Index, i.e. with deficient levels of nutrient, are rarely fully compensated in one season by the addition of extra nutrient. There is no substitute for a soil with good P and K fertility. But remember that the Index measured by soil analysis is an average value for the field and that there will be variability in nutrient status within the field; soil in some parts of the field may be significantly lower than the average, and in others of course higher. Any nutrient inputs which are required to correct a deficiency (a low Index) should be budgeted as a farm maintenance/improvement cost; they should not really be charged against the crop being grown.

The second part of the fertiliser recommendation is the replacement of the nutrients removed at harvest, for which the crop must pay. These nutrients must be replaced or the soil nutrient fertility will fall. The amount of each nutrient is the replacement or soil maintenance application and the quantity is directly related to the crop yield. The required quantity can be calculated by multiplying the yield, in tonnes, by the amount of P and K per tonne of harvested crop as shown in the PDA Leaflet 'Phosphate and Potash Removal by Crops' and in Appendix 5 of RB209. If the soil Index is significantly higher than the target Index level there may be an opportunity to omit the replacement dressing for a short period, BUT such a decision should only be made

with knowledge of the current soil nutrient Index and the soil should be analysed every 3-4 years to ensure that the target Index does not fall below the recommended value.

Phosphate and potash application requirements are simple mathematical calculations:

- a) How much  $P_2O_5$  and  $K_2O$  is removed in the harvested crop? (this gives the replacement recommendation for the maintenance of soil fertility).
- b) What, if any, adjustments are needed to the replacement recommendation to take account of soil Indices that are lower or higher than the target Index?

Calculating the amount of phosphate and potash required to replace offtake is not influenced by price. Where manures are available their efficient use is now more rewarding than ever, but the fact remains that phosphate and potash are not optional inputs. If crops are harvested and the nutrients contained in them are not replaced, sooner or later the reduction in soil fertility will result in smaller yields and poorer quality as well as leading to lodging and greater susceptibility to disease. Regular soil analysis is the key to managing soil fertility. Without the results of a recent soil analysis it is not possible to make sound decisions about phosphate and potash applications.

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