DO NOT APPLY P FERTILIZERS TO HIGH OLSEN P-INDEX SOILS - UK22

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Description
Do not apply mineral P fertiliser to soils that have Olsen Soil P reserves of 46 mg/l or above.

Rationale, mechanism of action
The amount of P lost by erosion or leaching depends on the soil P content. Losses in solution increase rapidly once soil P reserves reach elevated levels, e.g. Olsen Soil P reserves of 46 mg /l or above [1]. Losses can be minimised by maintaining soil P levels at Index 2 (Olsen P of 16-25 mg/l) or by allowing the P content of high P index soils to run down.

Applicability
The method is applicable to all farming systems, but would have greatest effect in intensive grassland and arable systems.

Effectiveness, including certainty
Soils with high P reserves make a disproportionate contribution to the total loss, so that when fertiliser applications are omitted, this can make a significant contribution to overall reductions (potentially greater than 100% of the fertiliser component of the baseline P loss) over time [2]. The effectiveness assumes that it is also possible to avoid manure applications to soils with high P reserves within the farm system.

The method has little effect on sandy loam soils because the fertiliser component makes only a small contribution to the baseline P loss. The method will have an additional, longer-term effect because of the gradual reduction in the P content of the soil.

Time frame
If mineral P fertiliser is not applied and the P content of high P index soils is allowed to decline, the amount of P lost with eroded soil particles and in solution will be reduced. Soil P is adsorbed on soil particles and is lost when sediment is eroded from fields in surface flow and in drain flow. The higher the soil P reserves, the greater the amount of P lost with the transported soil. The amount of P lost in soil solution is also greater on high P index soils, particularly on P-saturated soils. Balancing P inputs to crop offtakes and not applying P to soil with high P reserves must also take account of the P supplied in manure applications. However, the run-down of high soil P reserves is a gradual process and full benefits will only be achieved in the longer term (>10 years).

Environmental side-effects / pollution swapping
None.

Relevance, potential for targeting, administrative handling, control
The method could be easily implemented *via* advice, education and guidance. Particular guidance is required with soil sampling, analysis and interpretation of Soil

P Index levels. There would be resistance to adopting the method for those crops (e.g. potatoes) that can respond to P mineral fertiliser on high P Index soils.

Costs: investment, labor

Assuming 10% of the farm area has high P index soils, which misses a maintenance dressing of P.fertiliser, the method will bring cost savings to farmers in terms of P not applied (net of soil testing costs). There may be savings from possible field operations not carried out in applying it (if planned as a separate operation).

References

[1] Dawson, C.J. and Johnson A.E. (2006). Agricultural phosphorus in relation to its effect on water quality. Fertiliser Society Proceedings, No 590.

[2] Cuttle, S., Macleod, C., Chadwick, D., Scholefield, D., Haygarth, P., Newell-Price, P., Harris, D., Shepherd, M., Chambers, B. & Humphrey, R. (2007) An Inventory of Methods to Control Diffuse Water Pollution from Agriculture (DWPA) USER MANUAL. Defra report, project ES0203, 115 pp. p. 47-48 http://www.cost869.alterra.nl/UK_Manual.pdf