

**Soil fertility evaluation in Czech Republic, Latvia, Poland, Slovak Republic and the United Kingdom.** Editors Fotyma M., Shepherd M.

**Abstract**

Fertilizer use is important to maintain or improve soil fertility and, hence, maintain n crop (and food) production. The correct use of fertilizers is important both from an economical viewpoint, therefore, but also from an environmental viewpoint. In particular, unnecessarily high levels of soil phosphorus pose a threat to surface waters when transported by erosion and/or surface run-off (Bockman *et al.*, 1990). With the advent of manufacturing processes that resulted in the availability of relatively cheap artificial fertilizers, and the improvement in potential crop production (through better varieties, weed control chemicals, mechanisation and farming systems) in the mid 20th century, came the need to develop appropriate fertilizer recommendation systems (Cooke, 1975). The initial aim was primarily to boost yields. In each country, fertilizer recommendation systems have developed generally independently of other countries. Recommendations have been based on large fertilizer research programmes, enabling the calibration of crop response against soil fertility. Despite this often independent and parallel development, the principles behind most systems are remarkably similar: soil test for the major nutrients P, K, Mg and soil reaction (but not nitrogen), defining soil fertility categories based on the analysis and adjusting fertilizer inputs depending on soil fertility class and crop requirement. However, there are also some differences between systems, particularly in the soil extractants and analytical methods used and the categorisation of threshold levels for soil fertility. Consequently, there may be scope for recommending quite different levels of fertilizer depending on the recommendation system used. This is clearly unsatisfactory and warrants further investigation, especially if systems are to be transferable across Europe. As part of an EU project MAINTAINE (Managing Inputs of Nutrients to Avoid Insufficient or Excess), funded under the Copernicus programme, Research Institutes Latvia, Poland, UK, Czech and Slovak Republics and the Netherlands have joined to try to develop a better accounting system for fertilizer recommendations in the presence of animal manure use. As a starting point it is necessary to understand the recommendation systems of individual countries. The aim was therefore to review individual fertilizer recommendation systems to identify similarities and differences, to examine the impact of any differences on fertilizer recommendations between the different systems, and to examine whether there is scope for producing a unified, pan-European, system. If the latter was found not to be possible, an additional aim was to test whether analytical results were directly transferable between countries by adopting some recalibration. As a starting point, we felt it necessary to instigate a

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programme of soil sample exchange between laboratories. This allowed an assessment of the nutrient status of a common set of soils by a range of methods (i.e. the standard methods of each participating country). The exercise therefore provided information on whether different methods were measuring the same or different soil nutrient fractions, and whether they would provide the same assessment of a soil's fertility status. This report therefore covers (a) a review of existing systems, (b) a comparison of soil analytical methods by sample exchange and analysis and (c) conclusions about the implications of the results on fertilizer recommendation systems.