

Approximative P index calculation to predict total P in rivers of CEE countries

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Recent changes in agricultural practices and their impact on the trophic status of surface waters in CEE countries have been evaluated using a few selected pressure and state indicators (phosphorus balance, phosphorus status and erosion of agricultural land, tentative P index, chlorophyll-a, total and phosphate phosphorus content of water) by compiling and analysing data from the literature.

The P index method was developed in the USA for assessing the environmental effects of agriculture (Sharpley et al., 2003) and has also been tested in Europe (Hethwaite et al., 2005). The P index contains a small number of carefully selected source and transport factors. The dataset compiled in the our study for the CEE countries does not allow a precise calculation of the P-index, but ve had data on P balances and on the degree of erosion which make it possible to calculate approximative indices for P loads. We applied a: weighting factors of 1, 3 and 5 for light, moderate and strong erosion, respectively, and these were multiplied by the corresponding area percentages and summed up for each CEE country. The annual average P balances from the 1980s were considered as an indicator of the long-term P surplus in agricultural soils and this was multiplied by the calculated erosion index. The resulting tentative P index was plotted against the total P concentrations in the rivers. Although the compiled data are extremely diverse in space and time and were often calculated using different methods, a significant positive relationship was found. Only 11 percent of the variation in TP for the rivers should be attributed to the tentative P index, i.e. to the impact of differences in the agricultural non-point source P load, which increased in the order: Estonia, Romania, Poland, Latvia, Slovakia, Bulgaria, Czech Republic and Hungary. This is confirmed by the fact that, according to Vollenbroek (1994) the contribution of agricultural diffuse P loads to the total P loads entering surface waters in the Danube Basin countries (which are mostly CEE countries) ranges from 9-10% in Slovakia, Croatia and Hungary to 28-40% in Romania, Austria, Germany and Slovenia. Our conclusion was the even very approximate data and calculation may be used as relevant indicator for water quality if data consistency is ensured. Thus, environmental statistics must be steered toward harmonization and toward collection of more environmentally relevant data.

References

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