A P Index-based mitigation planning tool for reducing phosphorus losses from land to water in Denmark

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Despite substantial abetment efforts during the past twenty years, phosphorus (P) loss from agricultural land to water is still a serious and costly environmental problem in Denmark. Therefore, environmental authorities demand tools for identifying critical source areas within catchments for targeting cost-effective mitigation measures. Phosphorus indexing tools can rank fields according to their relative risk of P loss and screen large areas because they operate with limited and generally available data. In Denmark a web-based tool has been developed that links the mapping of high risk areas of P loss to mitigation planning (www.np-risikokort.dk). This tool consists of three major parts: 1) a GIS component for viewing P Index maps and other relevant data, 2) a mitigation planning component for guided scenario analyses of selected field blocks in catchments and 3) a facility for downloading P index and scenario data. The Danish P Index tool operates at the field block scale, a mapping unit comprising several fields, and establishes separate P Indices for the transport processes soil erosion, surface runoff, matric leaching and macropore transport. The indices have been calculated *a priori* for all agricultural field blocks with a default set of input data, some of which can be changed by the user. Three risk classes of P loss are distinguished and the 10% highest P Index ranks for each transport process are considered high risk. Since the P Index tool cannot quantify P loss, each risk class has been associated with a representative P load for mitigation planning purposes. These loads are the basis for calculating the effects of a range of mitigation options. The estimated costs of various options are used for calculating the cost-effectiveness of mitigation plans. The user can either automatically have the tool select the best mitigation option for field blocks or he may choose individually. The P Index and mitigation planning tool is being tested by environmental authorities and its future use in Denmark is currently subject to political debate.