

## **A new methodology to estimate *Phosphorus LEA*ching from Soils to the *Environment* (PLEASE)**

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In 1990 a methodology was developed to estimate the phosphorus (P) losses to groundwater in the Netherlands (Phosphate Saturation Degree; PSD). This approach has been subsequently adopted in many other countries as an indicator for P loss. The phosphate saturation degree is based on the phosphate accumulation above the highest groundwater level in relation to the phosphate sorption capacity of the same layer. The PSD is an indicator for the *potential* P loss to groundwater and does not give any information about the *actual* P loss from agricultural land to surface waters. Phosphorus transport from soils through the upper groundwater is an important pathway which contributes highly to the P loads to surface waters in flat areas with shallow groundwater or in areas with tile drains. To locate those agricultural areas, which are the prime contributors of diffuse P losses to surface waters, information on the actual distribution of phosphorus throughout the soil profile and the distribution of lateral water fluxes is needed. In order to predict the actual P loss to surface waters a simple approach has been developed to estimate the annual P loss from a field to the adjacent surface water in terms of total-P and ortho-P (Schoumans et al., in prep.). In this presentation this simple methodology to quantify *actual* P loss, called PLEASE, will be discussed. The P concentration profile in the soil solution is determined by combining information of soil-P test with information of the soil chemical sorption capacity (which is e.g. in acid sandy soils related to the Al<sub>ox</sub> and Fe<sub>ox</sub> content). The concentrations in the upper groundwater may also be influenced by groundwater at greater depth and therefore also the upward seepage is taken into account. In our approach, the relative contribution of different soil layers to surface water loading is derived from the precipitation surplus and information about the upper and lower groundwater level during the year. The approach has been tested and published by Van der Salm et al. (this issue) and Dupas and van der Salm, 2010.

Dupas, R. and C. van der Salm, 2010. Validation of the model PLEASE at site scale. Alterra report 1968-2, Alterra, Wageningen.

Schoumans, O.F., C. van der Salm, and P. Groenendijk (in prep.). PLEASE: A simple procedure to determine P losses by leaching.

Van der Salm, C., G. Heckrath, B. Kronvang, M. Pleijter, G. Rubæk, and O.F. Schoumans (this issue). Predicting phosphorus losses with the model PLEASE on a local and regional scale in Denmark and the Netherlands.