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Dutch approach to develop efficient water quality monitoring schemes

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In 2003 a study started to determine a monitoring procedure in order to quantify the impact of the Dutch manure legislation on water quality at catchment scale. Four catchments were selected to develop such a methodology. One peat catchment, one clay catchment and two sandy catchments were selected as representative catchments for the major soil types that occur in The Netherlands.

The contribution of land to the diffuse pollution of surface water depends on a lot of factors, such as meteorological circumstances, hydrological conditions, soil characteristics, soil properties and soil status, land use, manure and fertilizer application rates, hydraulic conditions etc. As a result different sources and pathways can be distinguished, that will changes over time. As a result of this complexity it is impossible to determine the influence of all these factors separately and independently just by measuring the water quality of the surface water.

For this reason a monitoring scheme was developed for catchment scale in which measurements were combined with process oriented modeling approaches for the land-water-system as a whole. A validated process oriented modeling approach is necessary in order to understand the fate of nutrients applied with manure and fertilizers and to assess what will happen over time for each specific catchment system. Furthermore, the model can be used to adjust the location of the gauging stations and the frequency of the measurements and can fill in gaps in the data of the measurements. In fact the whole monitoring procedure is an iterative process between measurements and modeling and will end up in an efficient monitoring approach. Furthermore, the measurements are used to increase the validation of the tools.

In the near future this monitoring approach of measuring and modeling will be used to determine to what extend the different management strategies will effect diffuse nutrient losses to surface water. So, Measuring, Modeling and Management (MMM) are being combined to make a step forward with respect to the goals of the Water Framework Directive.