# Determination and ranking of target areas to plan and implement nitrogen reduction measures in catchment areas

**F. Wendland** (1), H. Bogena (1), M. Eisele (2), R. Kunkel (1) and W. Schäfer (2)

(1) Research Centre Jülich, D-52425 Jülich, (2) Geological Survey of Lower Saxony; Stilleweg 2, D-30655 Hannover

The implementation schedule for the EU water framework directive requires the creation of monitoring programmes for water bodies according to the intensity of the pollution risk by the end of 2006. Until 2009 river basin district management programmes have to be established followed by the implementation of measures from the management plans (until 2012). Within the EU - LIFE - Environment project WAGRICO (Water resources management in co-operation with agriculture) methods of geographical prioritisation and determination of environmental targets have been developed and derived in three pilot water bodies in the Federal State of Lower Saxony, Germany.

For a geographical prioritisation / ranking of low, medium and high priority units ("hot spot'' areas) in catchment areas a decision tree has been developed. The geographical prioritisation comprises information directly obtained from observed data as well as model results. As a measure for the current anthropogenic pressure to groundwater nitrogen concentrations in groundwater are considered. Additionally, modelled nitrogen emission data and modelled hydrologic/hydrogeologic parameters are used. By doing so, the nutrient surpluses by agriculture are coupled to the relevant runoff components (groundwater recharge, direct runoff) and a residence time/nitrate degradation model. As a result of this step, the actual nitrogen emissions into groundwater and surface waters as well as the relevant hydrologic/hydrogeologic key factors controlling the inputs are quantified area-differentiated.

For the hot spot areas subsequently regionally adapted nutrient reduction measures will be developed, whose efficiency with regard to their environmental impact and

socio-economic feasibility will be predicted based on the linked agro-economic / hydrologic-hydrogeologic model system.