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# Integrated catchment modelling for strategic planning and decision making: Werra case study

**J. Dietrich**

Ruhr-University Bochum (joerg.dietrich@rub.de)

In planning the programme of measures for the implementation of the European Water Framework Directive (WFD), two potentially contradicting political principles have to be regarded: cost efficiency of actions and the “polluter pays” principle. Catchment models can support a negotiation of theses principles, taking into account the spatial distribution of relevant natural and socio-economic characteristics of the river basin and of water uses.

The WDF sets ecological targets for water bodies. There is still a lack of knowledge concerning interactions between physical and chemical conditions on the one hand and ecological quality on the other hand. In a case study situated in the Werra river basin, river type specific ecological target values for nutrient concentrations in water bodies were defined using expert knowledge. Nutrient emissions from point sources were calculated using relatively certain data. Emissions from diffuse sources were estimated from socio-economic data and calibrated applying the SWAT model and a loosely coupled water quality model.

Packages of measures were planned at the meso-scale to meet the ecological target values in water bodies. The robustness of planning is discussed by analysis of the vulnerability of the different sub-catchments against climatic variability and two scenarios of socio economic development. The uncertainty of the approach designed for an early planning stage is critically discussed.