



System analytic tools for IWRM: decision process modelling and multi-criteria analysis in an unstructured decision environment

J. Dietrich and A. Schumann

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

Integrated Water Resources Management (IWRM) demands long term strategic planning. A huge uncertainty of data, modelling tools and future development of the natural, technological and socio-economic environment add up to a poorly structured decision problem.

Business process modelling aims to connect domain knowledge and information technology. A methodology for decision support in IWRM was developed exemplary shown on the programme of measures for the European Water Framework Directive implementation. The core system analytic elements are two models, which are written in the Unified Modeling Language (UML). The first model describes planning and decision making processes using activity models, whereas the second one uses class diagrams for structuring the related geospatial information.

Alternative management strategies were composed from the planning results and build up a decision space, which can be interactively explored with the Reasonable Goals Method/Interactive Decision Map technique (RGM/IDM). The selection of alternatives is performed using a reference point approach, which is compliant with the satisficing decision making concept from bounded rationality theory. The method does not require a preference modelling a priori. The easy-to-use interface supports social learning as well as negotiations in a participatory group decision making process.

A decision support system prototype was tested within a joint research project for integrated management of the Werra river basin in central Germany. The robustness of the results of the interactive multi-criteria analysis was discussed. This comprised a comparison with Compromise Programming and PROMETHEE methods.