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FAA
Bonn

To the
Organizing Committee of the
16th International Symposium on
Environmental Informatics:

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Submission of a proposal for a paper to be presented at the 16th International Symposium on Environmental Informatics: ”Environmental Communication in the Information Society” September 25 - 26, 2002 in Vienna, Austria

Dear Conference Committee:

the Research Association for Agricultural Policy and Rural Sociology (FAA) is a research and scientific policy counseling institution within the realm of the German Federal Department of Consumer Protection, Food and Agriculture. Main activities of the FAA are the analyses of relationships between agriculture and other economic sectors and the society, in particular, regional planning and environment. The FAA is project-partner within various interdisciplinary projects e.g. impacts of “Global Change” on society and environment in the Elbe area “Glowa-Elbe” and the development of water management concepts for German sub-catchment-areas of the river Rhine and the river Ems.

Since core parts of these projects are

- modeling and simulating environmental impacts of different agri-environmental policy measures as well as
- design of integrated strategies for sustainable development and management concepts for German river basin in close collaboration with stakeholders

the specified topics of interest are essentially covered. The FAA would like to present the Regional Agricultural and Environmental Information System RAUMIS for Germany as well as results of its application in the scope of diffuse water pollution on the ENVIROINFO VIENNA 2002.

Sincerely,

Horst Gömann

Quantifying impacts of different agri-environmental policies on the environment using the Regional Agri-Environmental Information System RAUMIS

Abstract

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Agriculture with its acreage-intensive production plays a major role regarding its impacts on environmental conditions e.g. diffuse water pollution, biodiversity, and cultural landscape. Borne by an increased overall environmental awareness the research in agricultural sciences increasingly focused on environmental topics in the last two decades. Natural relationships between agricultural production and environment have been explored thoroughly. Based on these relationships impact analyses of agri-environmental policy measures as well as changes in general conditions concerning the contribution to environmental sustainability are important.

In this paper the area-wide Regional Agricultural and Environmental Information System RAUMIS for Germany developed by Henrichsmeyer et. al. (1996) is presented. After a brief introduction of the model structure emphasis is put on further model-specific options and on applications results in the scope of diffuse water pollution. Besides extensive analyses on ex-post developments as well as competitiveness between regions RAUMIS strengths lie upon impact analyses of alternative agri-environmental policies. Especially the impacts on input use (e.g. fertilizer, chemicals etc.), land use, agricultural income, and agri-environmental-relationships can be evaluated on the basis of implemented indicators.

The mathematical programming model RAUMIS consolidates various data sources and reflects the German agricultural sector consistent to the national agricultural accounts. The model comprises more than 50 agricultural products, used inputs, and therefore pictures completely the German agricultural production with its intra-sectoral linkages. RAUMIS differentiates presently between some 340 Regions basically on a county level. A further improved consideration of natural locations i.e. on the lower municipality level is possible depending on the availability of adequate data.

For the determination and illustration of environmental impacts caused by agricultural production several environmental indicators are implemented in RAUMIS. Presently, RAUMIS displays a species and biotope protection indicator as well as nutrient balances. Nutrient balances result in fertilizer spill-over for nitrogen, phosphorus and potassium including mineral and organic fertilizer, symbiotic/asymbiotic nitrogen-fixing, and

atmospheric deposition. The fertilizer surpluses are calculated as quantity unit per acreage on the regional level and act as risk indicators for the quality of surface water. Further indicators indirectly related to environmental effects are structure and intensity (e.g. costs for pesticides) of agricultural production and live stock densities.

In the field of diffuse water pollution a direct inference of calculated fertilizer surpluses on actual depositions of nutrients into surface water is limited since natural conditions and soil properties (e.g. nutrient storage capacities, retention periods, etc.) vary considerably among regions. These factors are modeled in the geo-/eco-hydrological models e.g. GROWA98/WEKU (Research Center Jülich) or SWIM (Potsdam Institute for Climate Impact Research) that subsequently process the fertilizer spill-over and generate nutrient charges of ground and surface water.

Due to the close interdisciplinary collaboration with the geo-/eco-hydrological models results of impact analyses of various scenarios are presented. In this context global changes such as climate changes, an increasing liberalisation of international trade (WTO-negotiations), and the EU east-enlargement are of particular interest. Moreover, the impacts of different agri-environmental policies on agricultural land use and water supply as well as the impacts on input use (e.g. fertilizer, chemicals etc.) and water quality are evaluated.