Research Round Up

Title of the project: Actor modeling and actor-based modeling to support risk assessments for pharmaceuticals in drinking water and for mobile organic xenobiotics in surface waters

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Collaborating organisations: Institute for Social-Ecological Research, Frankfurt, and many others

Key issue/s addressed:

- How to support the development of strategies for sustainable development in case of large uncertainty (or even ignorance) and different problem perceptions within society
- Basic assumptions: These strategies must be formulated by negotiation among societal actors and cannot be based purely of scientific knowledge

Objectives:

- Explore the method 'actor modeling' and develop the method 'actor-based modeling of physical variables'
- Investigate how these methods support participatory scenario development
- Investigate how these methods can support risk assessment and the identification of realizable strategies

Planned Outputs/Outcome (by when):

- See objectives, by June 2008

Methodological approach:

- Actor modeling: Based on interviews or group model building with representatives of aggregated actors (e.g. industry, environmental protection agency, drinking water supplier), construct perception graph for each actor where possible actions, goals, and relevant factors (boxes) are connected by influence arrows among each other in a consistent and transparent form. All boxes and arrows are given symbols which are translated to quantitative values on a scale of 7, such that the utility of actions can be computed and optimal combinations of actions can be identified.
- Actor-based modeling: Based on actor modeling, derive possible future changes of important system variables like chemical production by defining the system state after the actors have performed actions with the highest utility in their perception.

Key findings so far:

Actor modeling makes the perceptions of the actors in a problem field more transparent to the actors themselves and to the other actors, and it increases the system knowledge of actors and scientists. Actor-based modeling can be used to estimate how actors will act in certain scenarios of the future, and to compute, in a semi-quantitative way, the relative changes of factors (e.g. percent change in the production of certain chemicals) that result from these actions. In the framework of integrated assessment and modeling, these changes of factors can then serve as input to physical models. Limitations of these new methods include the assumption that actors are homogeneous and that actor perceptions do not change in the future. It is not possible to obtain statistical representativeness, and it is difficult to balance between complexity and triviality in the PGs. Besides, the semi-quantitative computations might lead to spurious results. Model validation should certainly be performed together with the actors. Experts found the assessment of actor perspectives (and participatory scenario development) an important and welcome extension of the discussion on PNECs (Predicted No Effect Concentrations) and regulatory norms.

Please tick the relevant theme below:

Monitoring/ Analysis ☐ Exposure assessment ☐ Environmental Fate ☐ Effects ☐

Treatment Technology ☐ Risk Assessment **X** Other ☐