Giving scientific advice on cost effective measures for a cleaner Baltic Sea using linked models in a decision support system.

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The Baltic Sea is one of the areas of the world that is most severely affected by human activities.
Although there is an international agreement that nutrient input should be reduced, the measures taken so far have not resulted in major reductions in nutrient inputs nor in environmental improvements. The reasons are partly due to lack of knowledge on large-scale relationships and couplings between physics, biogeochemistry and ecological properties. But there is also a lack of overall drainage basin wide analyzes on cost effective measures. There is a danger in making wrong decisions, e.g. implement reduction schemes that are at worst ineffective or at best, far from cost effective.

Now researchers from many disciplines are faced with a common challenge: To develop a decision-support system, which can be used as the scientific base for cost-effective measures for the entire Baltic Sea. Such an effort is now made within the research program MARE (http://www.mare.su.se . A first prototype of this system, called NEST, is now ready for testing, evaluation and further development, in dialogues with scientist and environmental managers.

NEST link models of physical transports and biogeochemical transformations of nutrient in seven sub-basins of the Baltic, nutrient retentions in 23 different coastal regions adjacent to 23 sub-drainage basins for which retentions as well as cost estimates for 17 different abatement measures are calculated. Network analysis of nutrient is a key component of the system, linking biogeochemistry with economy. The user of the NEST can select a desired environmental improvement, currently Secchi depth improvement, for any or several of the sub-basins and the system calculates the minimum cost solution to reach this, distributing cost between measures and countries.