



Less agricultural phosphorus could be key to cleaner Baltic Sea

Reducing the amount of phosphorus used in agriculture could go a long way in meeting the Baltic Sea Action Plan (BSAP)¹ targets. A Swedish evaluation of measures for reducing agricultural phosphorus suggest phosphorus inputs to the sea could be cut by 180 tonnes per year, or about two-thirds of Sweden's target.

The nations surrounding the Baltic Sea have established the BSAP to restore the ecological status of the Baltic marine environment. A serious challenge for the BSAP is eutrophication caused by nutrients. Despite significant reductions in phosphorus inputs to the Baltic Sea, the BSAP stipulates they must be cut by another 42 per cent by 2021.

The research presented 17 measures to reduce phosphorus leakage from Swedish agriculture, several of which had not been examined previously. The costs and potential of the measures were examined.

The results indicated that the two cheapest measures were the reduction of phosphorus content in animal food and the supervision of fertiliser application at pig farms. Both of these can be achieved through information programmes for farmers at little or no cost. The estimated costs were €7-11 per kg of phosphorus reduced per year. For both measures the potential annual phosphorus reduction to surface waters was estimated to be 50 tonnes.

One of the most expensive measures was biogas production from manure, which was estimated to cost €2600 per kg of phosphorus reduced per year. However, biogas production also has climate benefits as it reduces methane emissions to the atmosphere and produces renewable energy. With higher electricity prices and higher pricing of greenhouse gas emissions, the cost of biogas production may fall in the future.

Other examples of measures included reducing the number of farm animals, increasing grass production, transforming farmland to forest and creating protection zones alongside rivers and streams beside farmland.

The research estimated that, altogether, the 17 measures could reduce the phosphorus input to the Baltic Sea by 180 tonnes per year, which is approximately two thirds of the Swedish commitment in the BSAP (290 tonnes per year). If the most expensive measures were excluded, this figure would drop to 165 tonnes per year.

Measures to reduce phosphorus from agriculture have a role to play in Sweden's BSAP obligations. However, economic considerations must be made alongside political and practical considerations. For example, reducing animal numbers or replacing farmland with forest may be politically controversial.

The results may be helpful in the selection of suitable measures to reduce agricultural phosphorus and in the design of achievable environmental targets, particularly for other marine regions in Europe.

1. See http://www.helcom.fi/BSAP/ActionPlan/en_GB/ActionPlan/

Source: Malmaeus, J.M. & Karlsson, O.M. (2010). Estimating costs and potentials of different methods to reduce the Swedish phosphorus load from agriculture to surface water. *Science of the Total Environment*. 408:473-479.

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