Main Sources of Eutrophication in Europe

Aquatic ecosystems in Europe suffer from eutrophication caused by excessive input of nutrients, namely nitrogen and phosphorous, from various anthropogenic sources. The most recently updated information shows that agriculture is the leading source of nitrogen pollution and that in some EU countries it is becoming the main source of phosphorous too.

The accelerated nutrient enrichment or eutrophication of water bodies from anthropogenic sources has become a significant environmental problem in most EU countries. Nutrients (mainly nitrogen (N) and phosphorus (P)) from a wide range of societal sectors cause extensive adverse biological effects in groundwater, lakes, watercourses, coastal and open-sea ecosystems.

Minimising the eutrophication and/or its effects is addressed in several EU directives including Urban Wastewater Treatment Directive, Nitrates Directive, and Water Framework Directive. In order to assess the effectiveness of current policies and to identify further steps, it is essential to know to what extent the main nutrients sources - agriculture, industry, scattered dwellings, and wastewater treatment plants - contribute to eutrophication of aquatic ecosystems in Europe.

A recent report released by the European Environment Agency provides updated information on the contribution of different sources to the pollution of the European aquatic environment by N and P. The results were obtained by compiling available information in a way that permits comparisons between countries, large river basins and sea areas, and to extract general conclusions at the European level.

Overall, the study showed that:

- 50–80 % of the total N pollution is caused by run-off from agricultural land;
- households and industry still tend to be the most significant source of P pollution. In Belgium and the Odra and Po catchments, wastewaters generally account for more than two thirds of the P load. However, in countries with improved purification of urban wastewaters (e.g. Nordic countries), agriculture sometimes become the main source of P pollution;
- for both N and P, increased percentage of agricultural land and population density lead to an increase in the total area-specific load of nutrient (kg N or P/ha per year). In particular, the total area-specific load of N in the catchments/countries in north-western Europe is more than double compared to Nordic countries and Baltic States.

Furthermore, the EEA report notes that discharges of both N and P from households and industries have decreased significantly during the past 30 years whereas the loss from agriculture has generally remained at a constant level. With regard to P, these changes are mainly due to improved purification of urban wastewater across EU.

On the other hand, due to a combination of processes affecting the nitrogen cycle in soil and water, the reduction of N from agricultural sources to aquatic environment can be delayed after measures have been implemented on land. In fact, in some countries, measures to reduce the nitrogen surplus on agricultural land are now beginning to show results in terms of reduction in agricultural inputs of N (e.g. in Denmark, a 34% decrease in N input was observed from 1989 to 2003).

EEA argues that a European-wide assessment of societal sectors’ contribution to nutrient loads should be carried out across Europe at regular intervals. The resulting data would be key in the policy formation process and in monitoring the implementation of policies and the effectiveness of measures.

For more information: http://reports.eea.eu.int/eea_report_2005_7/en

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