

## Risk Factors in Water

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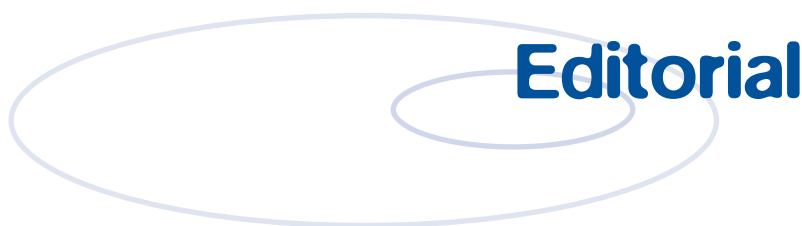
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# Editorial



Hans-Peter Kohler is head of the group "Environmental Biochemistry" in the department "Environmental Microbiology and Molecular Ecotoxicology".

In 1962, the American biologist and author Rachel Carson condemned the pollution of surface waters and ground water by pesticides as an unacceptable risk. Her book "Silent Spring" gave major impetus, leading to an increased public concern for clean water and air and unpolluted soil. This pressure led, among other things, to the formation of the Environmental Protection Agency (EPA) in the USA in 1970. In Switzerland, an environmental protection article was added to the federal constitution in 1971 and carried by a clear majority of the votes. The foundation for comprehensive environmental legislation was laid. The quality of streams and lakes has improved significantly since then, in part due to technical advancements, more stringent environmental laws, and changes in the behavior of the public. Many of the prominent environmental problems of the "early days" may be considered solved. Despite this fact, the topic "Risk Factors in Water" is still relevant, even 40 years later.

Problems surfacing today are far more difficult to understand and deal with the increase of female characteristics in male aquatic organisms, the development of resistance to antibiotics, and the occurrence of chronic poisoning by drinking water containing arsenic. At the EAWAG Information Day 2001 dealing with "Risk Factors in Water", it was evident that today's water pollution problems are complex and multi-dimensional. Everyday activities of our civilization cause a large number of the chemicals to be released into our waters. Pharmaceuticals and hormones are increasingly of concern. They are typically present in very low concentrations, but can still have undesirable consequences. Our wastewater treatment plants are not

designed to eliminate such "micro-pollutants".

Risk analysis of chemicals are based, in part, on the assessment of negative effects on aquatic organisms. It is impractical, however, to test for all possible effects on all possible organisms. We must, therefore, set reasonable priorities. Furthermore, how do we act if a chemical has a negative effect on only one of a hundred organisms tested, for example, the water snail? How do we weigh and assess this result? In a strictly statistical analysis, the snail would "disappear" in the error bar since 99% of the organisms were unaffected. Where do we draw the line? How important is the snail? This example illustrates that in the area of risk analysis we have a great need for scientific and political tools.

The Swiss National Science Foundation has recognized the critical nature of this situation and has initiated two national research programs<sup>1</sup>: the NRP 49, "Antibiotic Resistance", and NRP 50, "Endocrine disruptors: Relevance to Humans, Animals and Ecosystems". Both programs focus on the correlation between micro-pollutants in the environment and negative environmental impacts, as well as on ways to mitigate the effects and the risks. EAWAG has several groups involved in multiple projects within these national research programs.



<sup>1</sup> For more information, see:  
[www.snf.ch/en/rep/nat/nat\\_nrp\\_49.asp](http://www.snf.ch/en/rep/nat/nat_nrp_49.asp)  
[www.snf.ch/en/rep/nat/nat\\_nrp\\_50.asp](http://www.snf.ch/en/rep/nat/nat_nrp_50.asp)