

Toward an Integrated Transdisciplinary Approach to Solving Environmental Problems

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Since the creation of the U.S. Environmental Protection Agency (EPA) four decades ago, much progress has been made in reducing emissions from the electric utility and mobile source sectors in the United States. These efforts have helped in improving human health and the environment. Despite these dramatic achievements, human exposures to chemical contaminants and associated risks are still a concern as a result of social factors and demographic patterns pertaining to population, urban sprawl, consumption of fossil fuels, and industrial activity. In addition, some of our past management strategies have inadvertently created new problems while helping solve a current environmental problem. For example, to help reduce petroleum consumption by motor vehicles, Methyl Tertiary Butyl Ether (MTBE) was used as a fuel additive; while attempting to help address an air pollution problem, its use has contributed to ground water pollution.

Whereas the atmospheric loading of pollutants has decreased substantially in the United States and Europe, emissions from developing economies, such as Brazil, China, and India, have been rising and are projected to continue to increase the pollutant burden in the atmosphere. There is scientific consensus that human activity has been contributing to climate change and threatening our environment. To address properly these complex problems, we must move away from the current single pollutant, single medium, and single discipline approach for problem solving to a more integrated inter-disciplinary approach. We will then be able to better understand the problems confronting us and be positioned to develop sustainable solutions that safeguard human health and the environment.

This EM issue addresses the need for integrated transdisciplinary research for problem solving (i.e. systems approach) by giving examples of complex environmental problems confronting us now. The first article by Driscoll et al. uses the so-called acid rain problem as an example and illustrates how integrated assessments have been conducted in the 1980's and the lessons to be learned from this multidisciplinary research. The second article by Horton et al. deals with climate change and approaches to effectively deal with this problem. The third article by Bruins et al. addresses transportation fuels in the 21st century. The fourth article by Kryak et al. discusses human exposure to motor vehicle-related pollutants near major roadways in the urban environment. The final article by Dyer and Reiter presents EPA's research approach to solving the environmental problems in the 21st century.

Although all articles in this EM issue have been subjected to internal review and clearance, they do not reflect the views and policies of any federal agency.

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