

Title: Can Fuzzy Logic Bring Complex Environmental Issues into Focus?

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Abstract:

In everyday life and field such as environmental health /environmental impacts people deal with concepts that involve factors that defy classification into crisp sets *safe/minimal, harmful/ very high negative impacts, acceptable with mitigation measures*, and so on. A classic example is a regulator carefully explaining the result of a detailed quantitative risk assessment/environmental impact assessment report to a community group, only to be asked over and over again. *But are we safe? / But are environmental impacts minimal?* In this case, *safe/minimal* defies crisp classification because it is a multivariate state with gradation that varies among different individuals and groups. Furthermore, it is hard to define the terms such as: health, environment, hazardous, safe, air and water quality, risk and alike as these are vague or fuzzy terms based on perception.

In this sequel, we present formalism for the application of fuzzy logic concepts to *river water quality classification*- one of the important issues of environment management system. The objective of the study is to define river water quality for bathing straightway in linguistic terms with degree of certainty which is a departure from the indexing system. The concept of bathing in polluted river waters, water borne diseases and evidence theory forms an integral part of the presentation.

Would decision makers and the public accept expressions on environmental quality goals straightway in linguistic terms with computed degrees of certainty? Resistance is likely. In many regions, such as the United States and European Union, and therefore in India, both decision makers and members of the public seem more comfortable with the current system—in which government agencies avoid confronting uncertainties by setting guidelines that are crisp and often fail to communicate uncertainty. Perhaps someday a more comprehensive approach that includes exposure surveys, toxicological data, and epidemiological studies coupled with hybrid modeling will be researched for resolving some of the conflict, divisiveness, and controversy in the current regulatory paradigm.