

## **Training Course IV**

**Title:** Evaluation and Decision Tools: Comparison and Introduction to Multi-Criteria Decision Analysis for Ecological Applications

**Instructor:** Dr. Stefan Pudenz, Criterion - Evaluation and Information Management, Mariannenstr. 33, D-10999 Berlin, Germany; email: Stefan.Pudenz@criterion-bim.de

**Time:** Friday, May 18th, 1:00 p.m.-5:00 p.m.

### **Course objective:**

Describe and apply tools for evaluation and decision analysis that can be used to address ecological risk issues. This will be done by comparing different methods for multi-criteria evaluation and decision support and illustrating their application through practical demonstrations using data for various environmental problems.

### **Target audience:**

Scientists, students and practitioners interested in data analysis, risk assessment, and risk management tools, and those generally interested in multi-criteria evaluation and decision analysis.

### **Course description:**

One consequence of our information society is an enormous increase in available data, with many people attempting to glean as much information as possible from these data, especially for environmental evaluations and related decision processes. Various tools are available to support these activities. However, a common difficulty with the evaluation step is that many of the methods mask and aggregate the data, and therefore both valuable information and transparency are lost. This translates to potential impacts on acceptance of the final decision as well as concerns about what becomes of the participation principle. In this course, different methods for multi-criteria evaluation and decision support will be described and compared (such as the basics of AHP, PROMETHEE, ELECTRE and MAUT). This course will also introduce a rather new approach (HDT) that can be used to avoid the merging of data and thus preserve important elements of the evaluation and decision-making processes.

### **Course outline :**

1. Overview of methods (*90 minutes*)
2. Evaluation of a simple data matrix by the Hasse diagram technique (HDT) (*30 minutes*)
3. Tools to evaluate the evaluation (*60 minutes*)
  - sensitivity analysis
  - stability
  - robustness
  - dimension
  - p-algorithms
4. Evaluation of a complex data matrix by the complete tool box of HDT. (Additional data matrices may also be considered, depending on time and the state of preprocessing by standard statistics.) (*120 minutes*)

### **Brief biographical sketch of instructor :**

After receiving his PhD in Environmental Science at the Leibniz Institute of Freshwater Ecology and Inland Fisheries in Berlin, Dr. Pudenz worked for several years on the development and application of mathematical/statistical evaluation and decision tools. His main fields of application were terrestrial and aquatic ecology. After the formation of his company (Criterion), his work has also extended to industrial projects, including those dealing with evaluation and decision support for product development.