

Dr. Yakov Ben-Haim

Professor
Yitzhak Moda'i Chair in
Technology and Economics



Technion

Israel Institute of Technology
Faculty of Mechanical Engineering
Haifa 32000 Israel

<http://info-gap.com> Blog: <http://decisions-and-info-gaps.blogspot.com> <http://www.technion.ac.il/yakov>
Tel: +972-4-829-3262, +972-50-750-1402 Fax: +972-4-829-5711
yakov@technion.ac.il

Info-Gap Methods for Environmental Monitoring and Management

Noon, Wednesday, 6 February 2013, Los Alamos National Lab

Abstract Info-gap theory is a method for analysis, planning, decision and design under uncertainty. The future may differ from the past, so our models may err in ways we cannot know. Our data may lack evidence about surprises: catastrophes or windfalls. Our scientific and technical understanding may be incomplete. These are info-gaps: incomplete understanding of the system being managed. Info-gap theory provides decision-support tools for modelling and managing severe uncertainty. After outlining the info-gap methodology, we explore several applications to environmental monitoring and management.

Outline

- Info-gap uncertainty and the principle of indifference
- Surveillance for biosecurity: Barrow Island
- Design and analysis of water storage and processing.
- Applications of info-gap theory

Selected Publications

• Yakov Ben-Haim, 2006, *Info-Gap Decision Theory: Decisions Under Severe Uncertainty*, 2nd edition, Academic Press, London.

• Yakov Ben-Haim, 2010, *Info-Gap Economics: An Operational Introduction*, Palgrave.

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• Yakov Ben-Haim, Craig Osteen and L. Joe Moffitt, 2013, Policy Dilemma of Innovation: An Info-Gap Approach, *Ecological Economics*, 85: 130–138.

• John K. Stranlund and Yakov Ben-Haim, 2008, Price-based vs. quantity-based environmental regulation under Knightian uncertainty: An info-gap robust satisficing perspective, *Journal of Environmental Management*, 87: 443–449.

• Helen M. Regan, Yakov Ben-Haim, Bill Langford, Will G. Wilson, Per Lundberg, Sandy J. Andelman, Mark A. Burgman, 2005, Robust decision making under severe uncertainty for conservation management, *Ecological Applications*, vol.15(4): 1471-1477.

• Atte Moilanen, Michael C. Runge, Jane Elith, Andrew Tyre, Yohay Carmel, Eric Fegraus, Brendan Wintle, Mark Burgman and Yakov Ben-Haim, 2006, Planning for robust reserve networks using uncertainty analysis, *Ecological Modelling*, vol. 199, issue 1, pp.115–124.

• Atte Moilanen, Astrid van Teeffelen, Yakov Ben-Haim and Simon Ferrier, How much compensation is enough? A framework for incorporating uncertainty and time discounting when calculating offset ratios for impacted habitat, *Restoration Ecology*, vol. 17, #4, pp.470–478.

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• Yemshanov, D, FH Koch, Y Ben-Haim and WD Smith, 2010, Detection capacity, information gaps and the design of surveillance programs for invasive forest pests, *J Envir Mgt*, 91: 2535–2546.

Additional information: <http://info-gap.com>