

IIFET member response to info request from Diana Tingley (Diana.tingley@port.ac.uk) posted 24th Oct 07:

Original info request:

“First, I would like to hear from anyone in the IIFET community who is currently researching, or knows of past work, in the subject area of risk and uncertainty in the fisheries system. The work could relate to any aspect of risk identification, analysis, management and/or communication or some aspect of dealing with the incumbent uncertainties in the fisheries system.

Second, I would like to hear from anyone who knows of, or has developed, any games, interactive simulations or role playing exercises/events of relevance to the fisheries system and its management”.

Reasons for request:

- I am currently working on an EU FP6 research project – PRONE: Assessing risk in fishery advice and management decisions (Co-ordinator: Sakari Kuikka) - particularly on aspects related to risk perception, identification and communication.
- I've also put forward a proposal for a Special Session at IIFET 2008 focusing on risk and uncertainty and am looking to expand my list of possible participants/invitees.
- I am considering putting forward a proposal for another interactive Special Session providing IIFET 2008 attendees with a chance to play/use/experience some of the games, interactive simulations or role playing exercises/events that have been developed to date. Some of these games etc. have links to risk communication issues, e.g. if communication/ understanding of issues between stakeholders is improved cases of risk ‘mis-perception’ (and their negative/unintended consequences) may be reduced.

Results:

1) Risk and uncertainty request

Name	Contact / organisation	Area of interest
Rick Fletcher	Rick.Fletcher@fish.wa.gov.au Marine Research Laboratories, Department of Fisheries, PO Box 20, North Beach 6920, WA, Australia;	<ul style="list-style-type: none">• Fletcher, W. J. (2005). The application of qualitative risk assessment methodology to prioritize issues for fisheries management. <i>ICES Journal of Marine Science</i>, 62:1576-1587.• Fletcher, W. J. (2006). Frameworks for managing marine resources in Australia through ecosystem approaches: do they fit together and are they useful? <i>Bulletin of Marine Science</i>. 78(3): 691–704, 2006• Fletcher, W.J., Chesson, J., Sainsbury, K.J., Hundloe, T.J. and M. Fisher. A flexible and practical framework for reporting on ecologically sustainable development for wild capture fisheries. <i>Fisheries Research</i> 71 (2005) 175–183• W.J. Fletcher (2007). <i>A Guide to</i>

		<i>Implementing an Ecosystem Approach to Fisheries Management (EAFM) within the Western and Central Pacific Region.</i> Forum Fisheries Agency, Honiara, Solomon Islands. Version 4.2 October 2007.
Laura Jodice	jodicel@yahoo.com Program Manager: Training Managers for 21st Century Fisheries Initiative project. (http://oregonstate.edu/dept/trainfishmng/casestudy.html)	“Project developing field-researched decision-focused cases for use in fisheries management education and outreach.... of the marketing cases being developed focus on companies facing <u>risk and uncertainty</u> intensified by a globalization of seafood trade as well as environmental changes, local competition and supply, sustainability based seafood certification, and/or changes in consumer demand.”
Helen Davies	hdavies.davies@btinternet.com Case Study writer: Training Managers for 21st Century Fisheries Initiative project.	Developing one of the above cases re: small pelagics.
Ola Flaaten	olaf@nfh.uit.no Professor, Department of Economics and Management, Norwegian College of Fishery Science, University of Tromsø	<ul style="list-style-type: none"> • Ref: <i>Fisheries Research</i> 37, 1-312 Special Issue: Fisheries management under uncertainty. <p>This volume contains papers from a symposium in Bergen, Norway 3-5 June 1997, on biological, ecological, economic, modelling, legal, political etc. risk and uncertainty.</p>
Stephen Stohs	Stephen.Stohs@noaa.gov Economist, Southwest Fisheries Science Center, US	<p>Worked on problems related to fisheries management in the presence of protected species take risk, which is an issue for NOAA Fisheries in managing commercial fisheries subject to the risk of incidental take of Endangered Species Act listed species, such as incidental take of the endangered leatherback turtle in drift gillnets.</p> <ul style="list-style-type: none"> • Stohs, S. (2006). A Poisson Probability Model of Protected Species Take Risk. Presented at 2006 American Agricultural Economics Association meeting.
Monica Gambino	gambino@irepa.org Senior Researcher, IREPA Onlus, Istituto Ricerche Economiche per la Pesca e l'Acquacoltura, Salerno, Italy	<ul style="list-style-type: none"> • IREPA Report: "The risk management in the fishery sector". <p>The coordination and main research of the project was led by ISMEA (Institute of services for the agriculture food market). The report is written in Italian and examines the main risk types (production, price, financial, institutional, social) and (public and private) management tools existing in the Italian aquaculture and fishing sector.</p>
Jim Kirkley	jkirkley@vims.edu Department of Fisheries Science, Virginia Institute of Marine Science.	<ul style="list-style-type: none"> • Gordon, D. & G. Munro. (Eds). (1996). <i>Fisheries and Uncertainty: A Precautionary Approach to Resource Management</i>. University

		<p>of Calgary Press, Canada, 1996, 195 pp.</p> <ul style="list-style-type: none"> • Hanna, S. (1983). <i>The Economics of Uncertainty: A Survey of the Literature on Uncertainty with Particular Reference to the Fishery</i>. NOAA Technical Memorandum NMFS F/NWC-47. • ?Bockstael, N. & J. Opaluch. (1983). Discrete Modelling of Supply Response under Uncertainty: The Case of the Fishery. <i>Journal of Environmental Economics and Management</i> 10(2): 125-37. • ?Opaluch, J. & N. Bockstael (1984). Behavioral Modeling and Fisheries Management. <i>Marine Resource Economics</i> 1(1).
Porter Hoagland	<p>phoagland@whoi.edu Marine Policy Center, Woods Hole Oceanographic Institution, USA.</p>	<p>Review of papers dealing with uncertainty in the management of fisheries:</p> <ul style="list-style-type: none"> • Andersen, P. and J. Sutinen. (2002). Stochastic bioeconomics: a review of basic methods and results. In Anderson, L.G., ed., <i>Fisheries economics: Collected Essays</i>. Volume 2; International Library of Environmental Economics and Policy. Burlington, Vt.: Ashgate, pp. 101-20.
Marty Smith	<p>marsmith@duke.edu Assistant Professor of Environmental Economics, Duke University, US.</p>	<ul style="list-style-type: none"> • Smith, M. & J. Wilen (2005). Heterogeneous and Correlated Risk Preferences in Commercial Fishermen: The Perfect Storm Dilemma. <i>The Journal of Risk and Uncertainty</i>, 31:1; 53–71. • Sanchirico, J, Smith, M. & D. Lipton. (in press) An empirical approach to ecosystem-based fishery management. <i>Ecological Economics</i>. • Smith, M. (2000). Spatial Search and Fishing Location Choice: Methodological Challenges of Empirical Modeling. <i>American Journal of Agricultural Economics</i>, Vol. 82, No. 5, Proceedings Issue. (Dec., 2000), pp.1198-1206.
Eric Thunberg	<p>Eric.Thunberg@NOAA.GOV Social Sciences Branch, Northeast Fisheries Science Center, NOAA.</p>	<p>Provided section of “<i>impact assessment that our Branch worked on not too long ago. The methods involves estimating theoretical probability distributions from a set of empirical distributions of landings from assessment models run by our population dynamics Branch. Note that we substitute theoretical probability distributions for empirical because the assessment models generated up to 100,000 realizations for each stock and each year. Simulations using these probability distributions are coupled with economic information (price models and costs) to generate probability distributions for landings and returns to crew and vessel owner income over time. In past analyses we have also included probability distributions representing the residuals from the price models.</i></p>

		<i>This allows us to show median results for different rebuilding strategies as well as confidence intervals (see figures in the attached). We can also produce cumulative probability distributions which allows us to evaluate preferred strategies”.</i>
Roger Corey,	Agriculture & Fisheries Division, U.S. International Trade Commission	Try: <ul style="list-style-type: none"> • Jon Sutinen and John Gates (risk) • 1st issue of Marine Resource Economics (circa 1983?) (risk/uncertainty)
Alistair McIlgorm	amcilmgorm@nmsc.edu.au Director, National Marine Science Centre, The University of New England and Southern Cross University, NSW, Australia	Suggestion: modelling done in the Antarctic (CCAMLR) around krill and fishing mortality and a risk averse framework etc.
Ole Jakob Bergfjord	ole.jakob.bergfjord@gmail.com NHH, Department of Finance, Bergen, Norway	<ul style="list-style-type: none"> • Bergfjord, OJ. (unpublished) Risk perception and risk management in Norwegian aquaculture • Georgakopoulos, G. & Thomson, I., 2005, "Organic salmon farming: risk perceptions, decision heuristics and the absence of environmental accounting", Accounting Forum, 29, 49-75 • Eggert, H. & Martinsson, P., 2004, "Are Commercial Fishers Risk-Lovers?", Land Economics, 80 (4), 550-560.
Francisco Javier Martínez Cordero	cordero@ciad.mx Laboratory of Aquaculture Economics Mazatlán, Sinaloa, MEXICO.	Have done some work on risk/uncertainty in aquaculture.
Gunnar Knapp	afgpk@uaa.alaska.edu	Has developed several "games" and experiments that simulate open-access Fisheries and the effects of IFQ's.
Richard Stoklosa	perth@e-systems.com.au	Working on these issues in WA, Australia
Keith R. Criddle	keith.criddle@uaf.edu Ted Stevens Distinguished Professor of Marine Policy, UAF Fisheries Division Juneau, AK, US	US National Research Council produced a report evaluating the introduction of nonnative oysters into the Chesapeake Bay which includes a chapter on Risk Analysis: http://books.nap.edu/catalog.php?record_id=10796
Paolo Accadia	Paola.accadia@port.ac.uk Cemare	<i>“I have developed and took part in developing a number of bio-economic models for management measure simulation, especially for Mediterranean fisheries. I just worked with risk and uncertainty in the fisheries system related to compliance in the COMMIT project, but my PhD in CEMARE is on the validation of bio-economic simulation models and validation is related to uncertainty.”</i>

2) Games, role play and simulations request

Name	Contact / organisation	Area of interest
Gorka Morino	gmerino@icm.csic.es Marine Science Institute, Barcelona/ Plymouth Marine Lab (Jan08)	Completed PhD titled: <i>'Simulation techniques for the bioeconomic analysis of Mediterranean fisheries: Game theory and effort dynamics. GAMEFISTO model'</i>
Erhard Ruckes	ruckes@virgilio.it	"In the 1970s the FAO contracted Dr Keith Haywood for the development of a Business Game for Fish Marketing. This was used in several training courses in developing countries. I guess the documentation has been lost but perhaps you can find out more from Dr Haywood in Hull (retired years ago like myself)."
Marty Smith	marsmith@duke.edu Assistant Professor of Environmental Economics, Duke University, US.	Has classroom game. Offered to explain in phone call.
Eric Thunberg	Eric.Thunberg@NOAA.GOV	<ul style="list-style-type: none"> Johnson, Barry L. and Roy A. Stein. 1986. "Competition for Open Access Resource: A Classroom Exercise that Demonstrate the Tragedy of the Commons" <i>Fisheries</i> 11(3):2-6
Doug Wilson	dw@ifm.dk Innovative Fisheries Management, Denmark	He developed "stakeholder negotiation simulation game based on Lake Victoria. Basically the stakeholders would negotiate for particular objectives, and come up with agreed management measures that were then fed into a simple model of the Nile perch fishery. I have not looked at it in years but I remember it worked pretty well."
Roger Corey,	Agriculture & Fisheries Division, U.S. International Trade Commission	Try: <ul style="list-style-type: none"> Chris Anderson, University of Rhode Island (http://www.uri.edu/cels/enre/) (simulation work)
Christine Werthmann	christinewerthmann@gmx.de The WorldFish Center, Mekong Regional Office, Cambodia	Just finishing PhD. "I worked on institutional issues in community-based aquaculture and I played three different game theoretical games in 8 villages in Cambodia and Vietnam".
Hendrik Stouten	hendrik.stouten@ugent.be	"I am currently working on a simulation model which will be translated towards a simulation game in due time. It is developed in Vensim@DDS using the methodology of system dynamics. The simulation game will give the opportunity to policy makers to test different policy instruments for their impact on fleet performance and dynamics. The simulation model is based on the case of Belgian sea fisheries."
Ahmed Khan	a.khan@fisheries.ubc.ca ahmedk@mun.ca Fisheries Economics Research Unit/ International Coastal network Canada	developed by Ratana Chuenpagdee (ratanac@mun.ca) 'Coastal Transects Analysis Model (CTAM) http://www.coastaltransects.org/ is a simple visualization and decision-support tool that can assist coastal managers, practitioners, policy makers, coastal communities and other coastal stakeholders in addressing multiple present and future demands in coastal areas. CTAM analyzes interactions and flows between natural and human systems, with current emphasis on fisheries and

		aquatic resources, using information provided by users, coupled with literature and experts' judgment'.
Olivier Thebaud	Olivier.Thebaud@ifremer.fr IFREMER, France	<p>"1. A group of colleagues based in CIRAD, in France, with an international network which has developed quite a bit in the past ten years, have been working in the area of simulation modeling using agent-based models, and the use of these models in the development of role playing games concerning resource management. While their applications have not explicitly focused on fisheries, I think their work provides insights which could be useful. Information on this work is via the web site: http://cormas.cirad.fr/indexeng.htm</p> <p>2. I am currently working with Christian Mullon, from IRD (christian.mullon@ird.fr), who is also in the process of developing such a tool, focusing on small pelagic fisheries worldwide. This is work in progress, but Christian might be willing to share experience to date on this with other colleagues involved in similar work".</p>
Simone Valle de Souza	sdesouza@une.edu.au University of New England, Australia	S. V. de Souza and C. Gondro. A Tactical Management Tool for the Northern Prawn Fishery in Australia (Abstract)
Frank Millerd	fmillerd@wlu.ca Professor Emeritus of Economics Wilfrid Laurier University, Canada	Perhaps Gunnar Knapp at the University of Alaska, Anchorage developed a game some years ago.
Dick Allen	rballen@uri.edu www.FisheryConservation.com Westerly, RI, US	<ul style="list-style-type: none"> • Fish Banks, Ltd. A computer-assisted, interactive role-playing simulation in which teams manage a fishing company. Participants try to maximize their assets in a world with renewable natural resources and economic competition. (http://www.sustainabilityinstitute.org/tools_resources/games.html) • AbaSim - a fisheries management simulation game of an abalone fishery. (http://fishdata.org/software/cuslibm2.htm) • Lobsense is a user-friendly egg and yield per recruit model for the U.S. Atlantic lobster resource. Download: http://www.lobsterconservation.com/nss-folder/lobsense/ • SIMLOB is a lobster fishery bio-economic simulation model. Download: http://www.lobsterconservation.com/nss-folder/simlob/
Ann Shriver	ann.l.shriver@oregonstate.edu	"You put four kids around the table; the rest are "resource managers" and "consumers". Each student has a pair of chopsticks. You pour 100 goldfish crackers in the middle of the table and tell them they're fishermen, they should go ahead and catch the fish. Pretty soon they have grabbed up all the fish. Then you say: "But what about next year?" and talk about reproduction. Ask the "managers" to come up with some idea to solve the problem of eating up all the fish. You can limit their "gear" by giving the fishermen each a pair of chopsticks and requiring them to fish only with those. Pretty soon some wiseacre is using the chopsticks in a sweeping fashion, rather than picking them up one by one (capital stuffing!). They will eventually come around to quotas; if it's

		<i>a sophisticated group they might get into how you allocate the quotas”.</i>
Francis Laloe	francis.laloe@mpl.ird.fr Centre d'Economie et d'Ethique pour l'Environnement et le Développement (UMR IRD-UVSQ)	<p><i>“I did some work dealing with uncertainty that may correspond (or not) to your question (IIFET network). I attach two papers to this message</i></p> <p><i>One is a simulation creating data with one model that can be almost perfectly fitted with another one. These models correspond to very different interpretations, from social sciences of natural sciences point of views”</i></p> <ul style="list-style-type: none"> • Laloe, F., Pech, N., Sabatier, R., Samba, A. (1998) Model identification for flexible multi-fleet, multi-species fisheries: a simulation study. •

Other refs of interest:

- Justus Wesseler, Hans-Peter Weikard, Robert D. Weaver. (2002) *Risk and Uncertainty in Environmental and Natural Resource Economics*. This volume presents a selection of the papers presented at the International Conference on Risk and Uncertainty in Environmental and Resource Economics held in June 2002 in Wageningen, The Netherlands."
- Johan A. Mistiaen, Ivar E. Strand. (2000) Location Choice of Commercial Fishermen with Heterogeneous Risk Preferences. *American Journal of Agricultural Economics*, Vol. 82, No. 5, Proceedings Issue (Dec., 2000), pp. 1184-1190
- Andersen, P. (1982). Commercial Fisheries under Price Uncertainty. *Journal of Environmental Economics and Management* 9:11–28.
- Andersen, P., and J.G. Sutinen. 1984. Stochastic Bioeconomics: A Review of Basic Methods and Results. *Marine Resource Economics* 1(2):117–36.
- Saphores, J.-D. (2003). Harvesting a Renewable Resource under Uncertainty. *Journal of Economic Dynamics and Control* 28(3):509–29