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FIELDS OF SPECIALIZATION:

- *Research:* Environmental and Resource Economics, Applied Game Theory, Sustainable Development, Computational Economics.
- *Teaching:* Environmental and Natural Resource Economics; Game Theory; Principles of Microeconomics; Principles of Macroeconomics; Intermediate Microeconomics; Statistics; Graduate Microeconomics.

EDUCATION

- Ph.D. Economics, University of Bergen, Bergen (1996). Dissertation: “Essays on the application of game theory in the management of natural resources (with emphasis on fisheries)”. *Dissertations in Economics* No 12, 1996, Department of Economics, University of Bergen, Norway.
- M.Sc. Economics, University of Bergen, Bergen (1993).
- B.Sc. (Hon.) Quantity Surveying, Ahmadu Bello University, Zaria (1986).

EMPLOYMENT RECORD

- Assistant Professor, Fisheries Centre, University of British Columbia, Vancouver, Canada. Teaching: Graduate courses in natural resource economics, applied game theory, microeconomics, and economic evaluation of ecosystems (November 2001- present).
- Adjunct Professor, Fisheries Centre, University of British Columbia, Vancouver, Canada. Teaching: Graduate courses in applied game theory, microeconomics, and economic evaluation of ecosystems (1996 - 2001).
- Senior Research Fellow (visiting), Chr. Michelsen Institute (CMI), Bergen, Norway (1999 – present).
- Senior Research Fellow, Chr. Michelsen Institute (CMI), Bergen, Norway (1995 – 1999).

- Visiting Professor, University of Tromsø, Norway. Teaching: Graduate course in natural and environmental economics (1999 to present).
- Visiting Professor, University of Namibia, Windhoek, Namibia. Teaching: Undergraduate course in natural and environmental economics (1999 to present).
- Research Fellow, Chr. Michelsen Institute (CMI), Bergen, Norway (1993 – 1995).
- Visiting scholar, Department of Economics and Fisheries Centre, University of British Columbia, Vancouver, Canada (1995 - 1996).
- Research Associate at both the CMI and the Foundation for Research in Economics and Business Administration, Bergen, Norway (1993).
- Assistant lecturer at the Department of Economics, University of Bergen, Norway: Teaching: Undergraduate courses in micro and macroeconomics (1990 - 1991).
- Assistant lecturer at the Department of Information Science, University of Bergen, Norway: Teaching: Undergraduate course in statistics (1989 - 1990).

RESEARCH PUBLICATIONS

Journal articles

- Ecological and economic aspects of size and placement of marine protected areas: A spatial modeling approach. *Natural Resource Modeling* (with Alasdair Beattie, Villy Christensen and Daniel Pauly), *in press*.
- Evaluating MPA Management: A New Modelling Approach. *Coastal Management*, (with Alder, J., Zeller, D., and Pitcher, T.J.), *in press*.
- Marine protected area performance in a model of the fishery. *Natural Resource Modeling*, *in press*.
- Optimal allocation of TAC and the implications of implementing an ITQ management system for the North-East Arctic cod. *Land Economics* (with Armstrong, C. W), 77(2001), 350-359.
- Cooperative versus non-cooperative management of shared linefish stocks in South Africa: An assessment of alternative management strategies for Geebek, 2001. *Fisheries Research* (with T. Hutton, M.H. Griffiths and T.J. Pitcher) **51**, 53-68.

- Cannibalism and the optimal sharing of the North-East Atlantic cod stock: A bioeconomic model (with Armstrong, C. W). *Journal of Bioeconomics*, **2**(2000), 99-115.
- Fish as vehicle for economic development in Namibia, 2000 *Forum for Development Studies*, **2** (2000), 295-315.
- Simulation of ecological and economic impacts of distant water fleets on Namibian fisheries. *Ecological Economics*, 2000 **32**, 457-464 (with Marcelo Vasconcello).
- Addressing the ecosystem effects of fishing using marine protected areas. *ICES Journal of Marine Science*, **57**(3): 752-760, 2000 (with Sylvie Gu nette, Jackie Alder and Ratana Chuenpagdee).
- Marine reserves and the restoration of fisheries and marine ecosystems in the South China Sea. *Bulletin of Marine Science*, **66**(3): 543-566, 2000, (with Pitcher, T. J., Watson, R., Haggan, N., Gu nette, S., Kennish, R., Cook, D., and Leung, A.).
- A review of game theoretic models of fishing. *Marine Policy*, 1999, **23**(1) 1-10.
- Markets and the fishing down marine food web phenomena, 1998, *EC Fisheries Cooperation Bulletin*, **11**, 3-4, September - December.
- Protected marine reserves as fisheries management tools: A bioeconomic analysis. *Fisheries Research*, 1998, **37**(1-3): 287-296.
- Cooperative and non-cooperative exploitation of the Arcto-Norwegian cod stock in the Barents Sea. *Environmental and Resource Economics*, **10** (1997), 147-165.
- Strategic dynamic interaction: The case of Barents Sea fisheries. *Marine Resource Economics*, 1997, **12**, 77-94.
- Bioeconomics and Catchability: Fish and Fishers behavior during stock collapse. *Fisheries Research*, 1997, **31**, 11-17 (with S. Mackinson and T.J. Pitcher).
- Hard methods for soft policies: Environmental and social cost benefit analysis. *Forum for Development Studies*, **1**(1996) 87-114 (with Angelsen A.). Also published as book chapter.
- Irreversible capital investment in a two-stage bimatrix fishery game model. *Marine Resource Economics*, 1995, **10**(3) 263 - 283.
- Growth, development and sustainability. *Development Matters*, 1994, **1**(2), 19-22 (with Angelsen A. and O.H. Fjeldstad).

Book chapters, edited Volumes and Reviews

- Marine protected areas. In J.H. Steele, S.A. Thorpe and K.K. Turekian, eds., *Encyclopedia of Ocean Sciences*. London: Academic Press, pp. 1654-1659, 2001 (with Hoagland, P., and S. Farrow).
- Economics of protected marine areas (Guest editor with Tony Charles). Special Issue of *Natural Resource Modeling*, 2001, *in press*.
- Social and economics aspects of protected marine areas implementation (Guest editor with Jackie Alder). Special Issue of *Coastal Management*, 2001, *in press*.
- The fishing enterprise and fisheries management. Contribution to a *UNESCO sponsored CD-rom Encyclopedia*, 2000. EOLSS Publishers, England, *in press*.
- Ecosystem justice and the marketplace, 2000, p. 140 – 153 in Coward, H., Ommer, R., and Pitcher, T. J. (eds.). *Fish ethics: Justice in the Canadian Fisheries*. Institute of Social and Economic Research (ISER), Memorial University, St. John's, Newfoundland, Canada (with M. Bawumia).
- Protected marine reserves as hedge against Uncertainty: An economist's perspective, 1998, p.301-309 in T.J. Pitcher, D. Pauly and P. Hart (eds.) *Reinventing Fisheries Management*. Chapman and Hall, England.
- Optimal landing strategies for the Arcto-Norwegian cod stock: Trawlers versus Coastal vessels, 1998, p.115-120 in S. Jentoft (ed.) *Commons in Cold Climate: Coastal Fisheries and Reindeer Pastoralism in North Norway*. Parthenon Publishing, England.
- Hard methods for soft policies: Environmental and Social Cost Benefit Analysis (in coll. with Angelsen A.), 1997, p.20-42 In F.A. Wilson (ed.) *Towards Sustainable Project Development*, Edward Edgar, UK.
- "Fisheries Mismanagement: The Case of the North Atlantic Cod by Rognvaldur Hannesson" *naturalSCIENCE*, 1998 (Book Review).

Reports, working papers, conference proceedings, etc.

- Incorporating ecosystem objectives into management of sustainable marine fisheries, including 'best practice' reference points and use of Marine Protected Areas. Invited paper prepared for the forthcoming Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem, Reykjavik, Iceland, October 1-4, 2001 (with Keith Sainsbury).
- Generational cost benefit analysis for evaluating marine ecosystem restoration. Fisheries Centre Research Report, 2001, *in press*.

- Small versus large-scale fishing operations in the North Atlantic (with Y. Liu and P. Tyedmers). Fisheries Centre Research Report, 2001, *in press*.
- Subsidies and their potential impact on the management of the ecosystems of the North Atlantic (Munro, G.R. and U.R. Sumaila) Fisheries Centre Research Report, 2001, *in press*.
- Back to the Future in Hong Kong: discounting and inter-generational equity in the use of ecosystem resources. Presentation to the Marine Biological Association of Hong Kong seminar series, Hong Kong, April 4, 2001 (with E.A. Buchary, W.L. Cheung and T.J. Pitcher. 2001).
- Determinants of inflation in Tanzania (with S.A. Laryea). CMI Working Paper WP 20001:12.
- A system dynamic model for the management of miombo woodlands (with A. Angelsen and G. Kowero). CIFOR Research Report, *in press*.
- A bioeconomic analysis of the Norwegian Spring Spawning Herring (NSSH) stock. SNF Working Paper No. A57/99 (with T. Bjorndal and A. Ussif).
- Restoration of overexploited capture fishery resources: An economic/Ecosim modeling approach, a 'Methodology Paper' of the Sea Around Us. Project (see www.fisheries.ubc.ca); (2000). In Pauly, D. and Pitcher T.J. (eds) Methods for evaluating the impact of fisheries on North Atlantic marine ecosystems. Fisheries Centre Research Reports 8(2): 106 - 113 (with Gordon Munro).
- Small versus large-scale fisheries: A multi-species, multi-fleet model for evaluating their interactions and potential benefits, a 'Methodology Paper' of the Sea Around Us. Project (see www.fisheries.ubc.ca); (2000). In Pauly, D. and Pitcher T.J. (eds) Methods for evaluating the impact of fisheries on North Atlantic marine ecosystems. Fisheries Centre Research Reports 8(2): 64 - 78 (with L.M. Ruttan and F.C. Gayanilo, Jr.).
- Evaluating the Benefits from Restored Ecosystems: A Back to the Future Approach. In R.S. Johnston and A. L. Shriver (eds.): Proceedings of the 10th International Conference of the International Institute of Fisheries Economics & Trade, Corvallis, Oregon, USA, 2000 (with T. J. Pitcher, N. Haggan and R. Jones).
- Biodiversity in a game theoretic model of the fishery. In R.S. Johnston and A. L. Shriver (eds.): Proceedings of the 10th International Conference of the International Institute of Fisheries Economics & Trade, Corvallis, Oregon, USA, 2000.

- Tracking fisheries landings in the North Atlantic, a 'Methodology Paper' of the Sea Around Us. Project (see www.fisheries.ubc.ca); (2000). In Pauly, D. and Pitcher T.J. (eds) Methods for evaluating the impact of fisheries on North Atlantic marine ecosystems. Fisheries Centre Research Reports 8(2): 114 – 122 (with Ratana Chuenpagdee and Gordon Munro).
- Marine protected areas and managing fished ecosystems. CMI Report No. 4, 1999 (with Sylvie Guenette, Jackie Alder, David Pollard and Ratana Chuenpagdee).
- Fishing gear impacts on the potential economic gains from Namibian hake. CMI Working paper, 1999, *in press*.
- Pricing down marine food webs. In Pauly, Christensen and Coelho (eds.), Proceedings of the EXPO'98 Conference on Ocean Food Webs and Economic Productivity. ACP-EU Fisheries Research Report Number 5, 1999.
- Economics of Namibian hake. In Proceedings of the Fisheries Management Seminar hosted by the Ministry of Fisheries and Marine Resources (Namibia) in collaboration with the *Nansen* Programme, Swakopmund, Namibia, 27 –28 August, 1998, pp 38-46.
- Management strategies, economic environment and bioeconomic gains from Namibian hake. Proceedings from the Soria Moria Conference, NFR, Oslo, October, 1998.
- Bioeconomics and the Ecopath/Ecosim Framework. In Daniel Pauly (ed.): Use of Ecopath with Ecosim to Evaluate Strategies for Sustainable Exploitation of Multi-Species Resources. Proceedings of a FAO/FC Workshop, Vancouver, Canada. Fisheries Centre Research Reports, 1998 Vol. 6 No. 2.
- Impacts of distant water fleets: an ecological, economic and social assessment. 1998, p11-111 *In: The footprints of distant water fleet on world fisheries*. Endangered Seas Campaign, WWF International, Godalming, Surrey, 122 p. (with Bonfil R., G. Munro, H. Valtysson, M. Wright, T. Pitcher, D. Preikshot, N. Haggan and D. Pauly).
- Fish as vehicle for economic development in post independent Namibia. CMI Working Paper, No. 11, 1997.
- Protected marine reserves as fisheries management tools: A bioeconomic analysis, p. 40 in *Objectives and uncertainty in fisheries management with emphasis on three North Atlantic ecosystems*. Proceedings of an International Fisheries Symposium Bergen, Norway 3 - 5 June 1997.
- Cooperative and non-cooperative exploitation of the Arcto-Norwegian cod, p.69 in D.A. Hancock and J.P. Beumer (ed.). *Developing and Sustaining World*

Fisheries Resources: The State of Science and Management. Proceedings (Vol. 1) of the Second World Fisheries Congress, 1996, Brisbane, Australia.

- Uncertainty and the role of economics in reinventing fisheries management, p. 63 in *Reinventing Fisheries Management*. Fisheries Centre Research Reports 1996 Vol. 4 No. 2.
- Bioeconomics of a Predator-Prey System in the Barents Sea, p. 10-11 in E.A. Babcock (ed.). *Graduate Student Symposium on Fish Population Dynamics and Management*. Fisheries Research Institute, University of Washington School of Fisheries, FRI-9611, 1996.
- Skeena River Watershed Committee Demonstration Decision Analysis Workshop Report. Fisheries Centre, University of British Columbia, Vancouver, Canada (with Pitcher, T., V. Gillette, T. Lee, S. Mackinson, and S. Salas 1996).
- Project appraisal and sustainability in less developed countries. Chr. Michelsen Institute Report R 1994: 1 (with Angelsen A., O.H. Fjeldstad).

GRANT SUPPORTED RESEARCH

- The Centre for International Forestry Research (CIFOR), Bogor, Indonesia, to develop a modeling framework to study the impact of government policy on the sustainable economic use of miombo woodlands in Southern and Eastern Africa.
- The Research Council of Norway to develop computational models that incorporate protected marine reserves in the fishing habitat (1998- 2000).
- The European Union's EU-ACP Fisheries Research Initiative, to develop a project "Markets and Global Fisheries (1998). As part of this effort, a workshop was convened in Bergen, Norway in March 1999 to initiate an academic discourse on "Markets, Global Fisheries and Development".
- The Research Council of Norway to develop bioeconomic models for the Namibian hake. (1997 - 99). The objective here is to develop models that will produce insights for the optimal management of Namibia's valuable hake stocks.
- The Department of Fisheries and Oceans, Canada (1996). To develop (in a team) a logical decision analysis model for the management of fishery resources under the control of the Skeena River Watershed Committee.
- The Research Council of Norway. To develop game theoretic models of fishing (1994 - 97). Project introduced a new computational method to fisheries models, and led to several publications in international journals.

- The Research Council of Norway (1993). To work on a project titled "Integrating environmental concerns into current project appraisal practices" (1993). Was a central figure in this project involving two other CMI Researchers. It resulted in several publications including a chapter in a book entitled "*Toward Sustainable Project Development*", which has been described as "outstanding book which will be invaluable to undergraduate and postgraduate students of development studies, to project and programme planners and managers, officials of international organisations and government departments".

CONFERENCES CONVENED

- Economics of Marine Protected Areas, University of British Columbia, July 6-7, 2000, Vancouver, Canada.
- Markets, Global Fisheries and Local Development, Chr. Michelsen Institute, 22-23 March 1999, Bergen, Norway.

PROFESSIONAL ACTIVITIES

- Editorial Board Member: Perspectives in Sustainable Tropical Agricultural Research (PiSTAR). From April 2001 to present.
- Reviewer for the academic journals *Marine Resource Economics*, *naturalScience*, *Environmental & Resource Economics*; *Canadian Journal of Fisheries and Aquatic Science*; *North American Journal of Fisheries Management*, *ICES Journal of Marine Science*; and the *Chapman and Hall Fisheries Book Series*.
- Member of the Scientific Committee for the year 2000 International Institute for Fisheries Economics and Trade (IIFET) Conference, Corvallis, Oregon, USA.
- Leader of the Scientific Committee for Oceanic Research (SCOR) team on closed areas (1997 - 1999). Team reviewed and extended the current state-of-the-art literature on the use of marine protected areas to mitigate the ecosystem effects of fishing. The work of the group was presented at a conference in France, March, 1999.
- External Examiner, Norwegian School of Economics and Business Administration, Bergen, Norway, 1994 and the Norwegian College of Fisheries Science, University of Tromsø, Norway, 1997.
- Financial Secretary, Norwegian Development Researchers Association (NUF), 1994 - 1996

- Member of Canadian Economics Association (CEA), International Institute for Fisheries Economics and Trade (IIFET), Natural Resource Modeling Association (NRMA). Norwegian Development Researchers Association (NUF).