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On the Contributions of Professor Rögnvaldur Hannesson to Fisheries Economics

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We are pleased to present this special feature in honor of Professor Rögnvaldur Hannesson. The papers in this section emerged from a workshop held at the Norwegian School of Economics in Bergen in June 2013 to mark the celebration of his 70th birthday.

Four of the papers presented at this workshop were invited for submission to this special section of *Marine Resource Economics*. Before being accepted they went through the standard *MRE* review process. The selected papers address four areas to which Professor Hannesson has contributed during his distinguished career. Andersen (2013) provides a call for complex simulation models that harken back to early work of Hanneson's using numerical cohort-style models. Arnason (2013) explores enforcement costs in a conceptual bioeconomic model. Ekerhovd and Gordon (2013) estimate parameters for empirical bioeconomics, focusing as Hannesson has done in a large body of work, on production relationships in the fishery. Lastly, Schrank and Roy (2013) offer a policy perspective for a large, important fishery.

In this article we highlight Professor Rögnvaldur Hannesson's contributions to the field of fisheries economics. Professor Hannesson is one of the world's leading fisheries economists with a career spanning over 40 years. It is often said that there is a tradeoff between quality and quantity. In the case of Professor Hannesson, this is not so. As one of the most prolific writers in the field, his output has been tremendous. However, the other characteristic of his writing is that of quality; both in terms of theoretical insights and razor-sharp analysis of important resource policy problems.

In addition to Professor Hannesson's theoretical and empirical scholarship, he has been an educator of economists, as well as biologists and policy makers, all over the world.

This article is divided in two main sections: a short biography and a bibliographic survey where some of the works have been selected for further annotations. This survey is a highly subjective endeavour, and with limited space available, no such attempt could give full justice to the total scientific production of Professor Hannesson.

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Biography

Rögnvaldur Hannesson was born on a farm in the vicinity of Höfn, Iceland. He completed his MA as well as PhD at the University of Lund (1974), but during his studies he also spent a year at the University of British Columbia working with Professor Anthony Scott and interacting with other resource economists, such as Peter Pearse, Harry Campbell, and Colin W. Clark. He started his career in 1975 as a lecturer at the University of Tromsø followed by a position as senior lecturer at the University of Bergen from 1976 to 1983. He was appointed professor of fisheries economics at the Norwegian School of Economics in 1983, a chair that became vacant upon the retirement of Professor Gerhard M. Gerhardsen, who had been appointed 30 years earlier. Professor Hannesson kept his chair for 30 years until his retirement in July 2013. He was also Research Director, Centre for Fisheries Economics, SNF Institute of Economics and Business Administration, Bergen, in 2001 and between 2002–2006.

He has been a visiting professor at the University of Delaware; University of Iceland; Humboldt University, Berlin; Memorial University of Newfoundland; University of Queensland; University of Washington; La Trobe University; and University of California, San Diego and lectured at several other institutions.

Professor Hannesson was president of the International Institute of Fisheries Economics and Trade (IIFET) from 1986–90. He was a member of the Advisory Board of the Fisheries Centre, University of British Columbia, Vancouver (1992–1998) and sat on FAO's Advisory Committee on Fisheries Research from 1997–2004.

In 2000, Professor Hannesson was honoured with IIFET's Distinguished Service Award, in recognition of his service to this institute, in particular, as well as to the field, in general.

Finally, Professor Hannesson has a very extensive network covering all parts of the world. He seems to have known everyone in the field of fisheries economics, as well as prominent scientists in other areas working on fisheries, national and international fisheries administrators, and managers. He has brought disparate researchers together, thereby acting as a catalyst stimulating joint work; sometimes with him, sometimes without. Without doubt, Professor Hannesson is a truly international professor.

Bibliography with Selected Annotations[1]

As of July 2013, Professor Hannesson's scientific production counts 7 books, 85 refereed journal articles, and 29 book chapters, as well as numerous conference proceedings. He has served as editor of several special issues of journals, headed international research projects, been involved in consulting, and given lectures all around the globe.

We made an attempt to classify Professor Hannesson's contributions, which was no easy task. This resulted in 6 broad headings, as well as 22 sub-headings.

It should, of course, be noted that there is likely an overlap between the different categories, as one paper may fit in more than one category. Nevertheless, just looking at this list provides one more characteristic of Professor Hannesson's scientific work, namely his diversity of interests that has inspired contributions to a broad range of subjects.

Below we highlight only a few of his writings that, we hope, will serve to illustrate some aspects of his career.

[1] Bibliography by category and topic can be found at:
<http://www.snf.no/Medarbeidere/Rögnvaldur-Hannesson.aspx>.

Bioeconomic Analysis

Under this topic, Professor Hannesson has contributed to the sub-areas of dynamic bioeconomic modelling, optimal capacity and quotas, and bioeconomic production functions.

Dynamic Bioeconomic Modelling

His 1993 book, also published in Chinese, illustrates Professor Hannesson's international character (Hannesson 1993). This book has been used as a text for many applied courses on fisheries economics and management. Over the years, he has served as a consultant to the FAO, OECD, World Bank, governments, and other institutions working on fisheries management problems all over the world. This also points to his role as educator, not only to students of economics and fisheries science, but also to fisheries managers.

The marginal stock effect, which represents the impact of stock size on unit harvesting costs, is an important concept in dynamic optimisation models. Despite its importance, few studies are devoted to empirical investigation of this concept and its impact on optimal exploitation policies. Hannesson (2007) presents results for two Norwegian trawl fisheries, namely cod and haddock jointly, and saithe. Although the effect on operating costs is relatively small, it is found to be substantial when related to costs directly attributable to the stock under consideration.

Optimal Capacity and Quotas

Hannesson (1975) introduced the striking idea to the field of fisheries economics that pulse fishing might be optimal. This result, which was derived from numerical optimisation of an empirical cohort-style model of the North Atlantic cod fishery, was an absolute novelty at the time. The basic idea was introduced in his PhD dissertation mentioned below (Hannesson 1974). It seemed counterintuitive and many researchers strove to find a theoretical explanation. Now we know that many models can lead to this outcome, but it took years of intense thinking before this explanation became clear. Moreover, age-structured bioeconomic modeling continues to be an active research area nearly 40 years after Hannesson's early work in this area.

In order to reduce variability in fishermen's incomes, it is sometimes suggested that policies with constant effort or constant catch should be implemented. Hannesson and Steinshamn (1991) investigate the consequences of constant fishing effort versus constant effort over time on fishermen's incomes and stock sustainability in the context of a dynamic bioeconomic model applied to Arcto-Norwegian cod. The main result from this study was that the difference between constant effort and constant catch in practice is very small.

Bioeconomic Production Functions

Hannesson (1983) shows how the existence of a bioeconomic equilibrium depends on the shape of the production function with stock size and fishing effort as input factors. Based on a case study of the Lofoten fishery, the catchability coefficient increases as the stock is reduced, which together with cost and demand conditions may contribute to the explanation of stock collapse. In addition, the model also determines optimal vessel size and capital intensity. This study is one of the early empirical investigations of a fisheries production function and, as such, has been widely cited.

Fisheries Management and Policy

This broad area includes ten sub areas: problems and tools; fishermen's organizations; sustainability; catch rights based management; subsidies, buyouts and costs of fisheries management; rents: capturing and dissipating; fisheries management in individual jurisdictions; marine reserves; aquaculture; and climate change. We have chosen to highlight six articles spanning four of these areas.

Fisheries Management: Problems and Tools

Professor Hannesson's PhD dissertation analyzes efficiency problems in fisheries (Hannesson 1974). One important contribution is that he investigates the degree of efficiency in the North Atlantic cod fisheries by calculating the optimum stationary rate of fishing for various assumptions about fishing costs and time preference using a Beverton-Holt model and compares this with actual harvesting. Inefficient exploitation is detected in all cases. In the last chapter he also launches the novel idea of pulse fishing and rotating fishing patterns as a possibility.

Catch Rights Based Management

In an article intended for biologists, Hannesson (1996) showcases his pedagogical skills. It highlights that ITQs are primarily an instrument for economic efficiency and not for stock conservation, but by reducing overcapacity they may also contribute to decreasing the pressure on resources. This insight might have been obvious for economists, but certainly not for biologists back in 1996.

Hannesson (1991) discusses four methods to ensure efficiency by fish owners in the wake of establishment of 200-mile exclusive economic zones and increased use of total allowable catch quotas (TACs). These four methods are privatisation, taxes, licences, and individual transferable quotas (ITQs). The article further discusses fixed ITQs versus shares of the TAC, stable versus variable ITQs, and how the TAC should be set each year.

Although most economists seem to favour ITQs as a tool of fisheries management, some favour the use of taxation which is commonly used to correct for market imperfections when it comes to environmental issues. Hannesson and Kennedy (2005) develop a stochastic discrete time logistic model to compare the relative efficiency of landing fees versus quotas when the objective is to maximise profit per year over a certain time horizon. Based on simulations with ecological uncertainty, Weitzman's (2002) result that favours landing fee control is reconfirmed, whereas if there is uncertainty about availability of fish or fish prices, the opposite may be the case.

Subsidies, Buyouts, and Costs of Fisheries Management

Although the implications of management costs on optimal management have been analyzed in theoretical models, regarding empirical information on management costs in fisheries, there was a gap in the literature. Arnason, Hannesson, and Schrank (2000) filled this gap and show tremendous variation in such costs between Norway, Iceland, and Newfoundland. They go on to pose pertinent questions relating to the economic benefits of management and who should pay for the management costs.

Rents: Capturing and Dissipating

According to received wisdom, as exemplified by Arnason, Kelleher, and Willmann (2008), rent loss in mismanaged fisheries is a measure of the economic loss involved. Professor Hannesson, always an iconoclast, is able to show that this is not necessarily so in a general equilibrium setting (Hannesson 2010).

Game Theory and Fisheries

Hannesson (1997) is a landmark article on the economics of international fisheries agreements. It analyzes how cooperation on internationally shared fish stocks can be supported by threat strategies. Among other results, the analysis shows that the number of agents compatible with a cooperative self-enforcing solution is not very high for highly mobile fish stocks. The analysis on how cost heterogeneity affects the prospects of cooperation is also notable.

Hannesson (2011) is an excellent survey on the application of game theory to fisheries, which covers all major contributions on cooperative and non-cooperative games since the initial papers from the late 1970s. It finds that the low prospects of cooperation in managing straddling and highly migratory fish stocks, shown in the recent strand of literature on coalition formation games, are overly pessimistic. The reason is that players are farsighted and, therefore, when deviating from an agreement, foresee the subsequent deviations by the other players. The survey identifies under-researched topics on the application of game theory to fisheries, such as: spatial distribution of fish stocks, their migration, enforcement issues, and imperfect information.

The remaining large areas (with sub areas in parentheses) to which Hannesson has contributed include high seas fisheries (high seas issues and extended fisheries jurisdiction); market studies (empirical studies, market strategy, and fish auctions); and theoretical contributions (competition and resource exploitation, economic growth, and market structure).

Postscript

Professor Hannesson has made extensive contributions to the field. He is still productive, and the number of publications referred to above may very well have increased by the time this article is read. Immediately after entering retirement, Professor Hannesson went to Montana for a research visit at the Property and Environment Research Centre in Bozeman. Perhaps he is retired in name only, and there is every reason to expect that Professor Hannesson will be as active in his fifth decade as researcher as in the previous four.

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