

Theme session V on Fisher's perceptions and responses in fisheries management

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Background

In the open lecture, and in some other presentations, it was reminded that fisheries managers are managing humans, not fish, and that it is through intervention into fishing behavior that one makes fisheries become sustainable.

Therefore, the expected response of the fleet, given a suggested management options, may be considered to be an important element of the advice given by the research community to fisheries managers. In ICES context, this naturally holds true only to the extent where science can help in evaluating the likely responses. However, in the same way as e.g. natural mortality is usually evaluated by expert knowledge, the advisory body may need to assume e.g. that fishermen are profit maximisers (i.e. to use economic theory to predict behavior) or, alternatively, use empirical observations and the help of social scientists in the evaluation of likely responses. In both cases a good understanding of fishers' perceptions is important because any decision by fishers' will be based on their perception about the resources.

Furthermore, there is an increasing expectation that fisheries management decisions should be based on participatory processes and on transparent knowledge and decision criteria. Fishers' perceptions are important within a participatory and transparent framework both because a gross mismatch between these perceptions and decisions made will lead to loss of legitimacy of management and because fishers' perceptions can contribute to the knowledge base for management decisions.

In managing the fishing behavior, the tools are chosen on the basis of the objectives society has given, as well as on the basis of the features of the fisheries system. The fishermen's response has an impact on the implementation success of the management, and it can be argued that this response must be taken into account when considering e.g. the magnitude/strength of the suggested management action. However, the reference points ICES is applying and the ICES advice do not consider possible adaptations in fishers' behaviour.

The fleet reactions will play an important role in the development and implementation of harvest control rules. When the ICES community is facing this new challenge input from economists and other social scientists is needed. The aim of the session was to shed light on these issues and to evaluate what types of research activities are going on in this field in ICES area and lessons from research elsewhere.

Presentations

The theme session papers were divided into three groups: a) Description of the system, b) Modeling of the system and c) Management.

Description of the system

Docs. V:28 and V:08 described fishermen's perceptions of the management system and their motivations to stay put or in or leave the fishery. The freedom and independence of the profession were the strongest motivations in both cases. Interestingly, in the Archipelago of Finland the fishermen were not willing to leave their home area even in a case of extreme negative change in fisheries, whereas in the Portuguese case fishermen were more willing to change their living area than leaving their profession. This may be explained by the fact that in

the Archipelago Sea in Finland, the fishermen have a combination of incomes, which provides them with more flexibility than when having fishing as the only profession. It can also be concluded, that the general view of fishermen of the content of science was not very positive.

Doc. V:04 gave an interesting example of mind mapping techniques used to analyze the causal beliefs of fishermen. Mapping was used as a systematic discussion tool to collect the different views and concerns. The fishermen's perceptions were also modeled in a quantitative way in Doc. V:07 (see Fig. 1), where a combination of questionnaires and interviews were used to estimate probabilistic dependencies of a social system.

Doc. V:12 was focused especially on one major concern in Baltic Sea: the impact of cyanobacteria bloom in fisheries. The results suggest that blooms are potentially harmful for fisheries, but the demand of fish shows no signs of the existence of cyanobacteria news in media.

The empirical analysis of technical creeping in fisheries (Doc. V:10) concluded that the economic interest to improve the performance of the fishing vessel is a driving force in fleet development. It has both an impact on the interpretation of CPUE data, as well as on the allowed fishing effort in an effort-based management system.

The fishermen views about research needs were highlighted in Doc. V:23. All fishermen are clearly not willing to participate to meetings, and there were evidence that the determined individuals in public forums do not necessarily reflect the view of the majority.

Critical views about research were common among fishermen (Docs. V:23, V:28, and V:29) and in some papers (Doc. V:23) science was blamed for stock collapse. Skeptical views were expressed especially about modeling. It is noteworthy that in other sessions it was mentioned that ecosystem models were better understood and accepted than age structured models (Doc. BB:06). This may reflect a common argumentation type of fishermen, where species interactions are easily seen as a reason for change. In addition to research, also the managers did not get very high credits (Doc. V:29).

Methodologically interviews and questionnaires dominated in this group.

Modeling of the system

The modeling studies covered a wide range of topics and methods. Doc. V:27 demonstrated a way to combine the outcomes of biological assessment models to the behavioral models of the social scientists. Paper Doc. V:31 made important notes on the different traditions of social and biological sciences in dealing with modeling and data analysis. These types of philosophical differences seem to create time demanding discussions in multidisciplinary projects.

Foraging theory (adapted from behavioral biology) was applied successfully to fishermen's behavior (Doc. V:01). The impacts of by-catch on reference points and implementation was analyzed (Doc. V:14) and it was concluded that the timing of possible density dependent processes (in which age group they occur) has a major impact on the impacts of by-catches.

Two economics papers focused on the impacts of marine protected areas (Docs. V:30 and V:13). It has been generally argued, that the closed areas would have a negative impact on the economics of the fisheries. The modeling was done technically in a different way in these two papers, but they both suggest that the above mentioned belief is not true, even though there is not either remarkable economic gain. As a comment it can be stated, that as one of the interests in using MPA is to have a reserve against uncertainty, the risk averse side of the probability distributions may be one justified way to analyze the results.

Management

Also management related papers were of high diversity. An analysis about the negotiation process of a management committee was presented (Doc. V:26) showing that negotiation results are easier to achieve during the increasing biomasses of the stocks.

V06 presented the use of gear information collected from fishermen and concluded that this type of additional information is useful when evaluating the changes in the selectivity properties of the fleets.

ITQ systems are currently intensively studied in bioeconomics and they are suggested as possible tools to increase the interest in long term management. Doc. V:22 demonstrated that when looking at different actors in a partly ITQ covered system, non-quota holders would like to have a smaller biomass than quota holders, and the managers may thus meet conflicts, if all fishing rights are not based on ownership.

In an interview carried out in North Sea fisheries, fishermen favored technical measures as the way to manage fisheries, and also effort control and marine protected areas were seen more favorable than quotas (Doc. V:32). Discarding was considered to threaten the ecosystem.

In New Zealand, the ITQ system has led to a situation where industry pays most of the research costs (Doc. V:05). Industry shows ownership of the results, which is likely based on the type of ownership of resource created by the ITQ system.

Three Swedish case studies suggested, that local co-management solutions may be successful in small scale fisheries (Doc. V:17), and that fishermen have a strong interest to look after their close by environment.

In earlier ICES papers it has been suggested, that the real error rates of the predictions would be estimated by comparing the prediction to the realized biomass. This may be a justified way, and the current analysis (Doc. V:20) demonstrates, that the human element may be important in the errors. Results show, that the bias is inversely related to biomass, i.e. that small biomasses are overestimated and large biomasses are underestimated. Deriving of safety limits to reference points by this type of approach may increase the interest to as unbiased estimates as possible.

Doc. V:19 was one of the few papers focusing exactly on the theme session topic, in demonstrating a systematic, semi-quantitative way to collect information from fishermen. The different fishermen's groups had different types of knowledge, dependent on the type of gear they used.

The Fisheries Minister of Scotland, Mr. Finnie gave a talk in the theme session titled "Experiences in managing fisheries". He discussed the problem of the cod fishery, where the good year classes of other species would have allowed higher effort, but the poor state of cod stocks did not allow this. He highlighted the need to offer options for managers, which then could be discussed by the managers and industry. He also highlighted the need for solid science in solving the complicated management problems, and the use of fishermen's knowledge in fisheries analysis. In the questions to the Minister, it was asked whether the economic analysis could be included in the fisheries advice to help the industry to understand the overall impacts of management actions. The Minister supported this view.

In the invited lecture, Professor Sean Pascoe presented the possible ways to utilize economic data and economic theory in predicting fishermen's responses. He underlined the use of incentives in directing the behavior. The exit and entrance to fisheries are among the most important issues in management, but the current available data sets do not allow appropriate parameterization of economic models to analyze this behavior. The modeling of compliance may need to include both economic and social factors.

Conclusion

As is sometimes the case in ICES theme sessions, some the papers were somewhat out of the scope of the session. However, there were some excellent and very topic relevant papers, which show that the usefulness of sessions of this nature within the ICES framework and science conferences, which ICES should be able to draw on in its work.

The theme session was much attended, even though the theme overlapped with session Y “Interactive Forum with the Fishing Industry”. Moreover, even though it has been anticipated that ICES should consider human dimensions in evaluating the likely success of given advice, it is likely that scientists are still mostly interested about topics which are familiar for them.

Presently one of the main thrusts of ICES advice is to develop and present options for long term strategies for marine management including evaluations of possible outcomes and trade offs for the various strategy options. On basis of the presentations in this theme session it can be concluded that inclusion of considerations of fishers’ perceptions and adaptations are crucial for such evaluations to be realistic and that active actions are needed to involve social and economic sciences in management strategy evaluations. Also, a good understanding of fishers’ perceptions is a requirement if scientists involved in the production of management advice is to have a constructive dialogue with stakeholders in a participatory and transparent management framework. The opinion of the theme session conveners is that this widening of the scope to a multidisciplinary approach would be not just an important but a necessary move for ICES if ICES is to pursue the provision of advice on management strategies further and to continue developing dialogue with stakeholders.

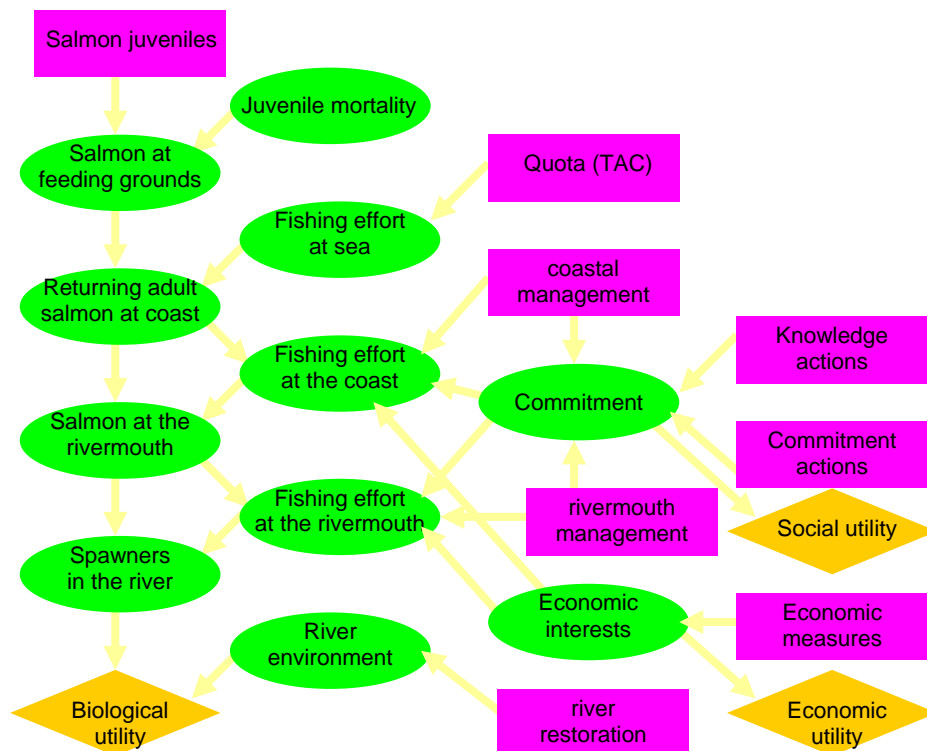


Fig.1. The probabilistic model structure of paper V7, where the probabilistic biological model (estimated by tagging data) was combined to human behavior model (estimated by questionnaire and interview data). The squares describe potential management variables and the ovals describe probabilistic variables.