

Theme Session K Report

2024

Incorporating human dimensions to improve fishing opportunities advice

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Context and objective

The success of fisheries management measures depends on the ability of the management agency to understand, measure, and anticipate human behaviour. Regulatory changes affect fishers directly and fish stocks indirectly and can complicate development and interpretation of data inputs to stock assessments, the use of assessments in management advice, and ultimately the effectiveness of regulations in achieving their goals. A focus on the importance of collaborating with the fishing industry when managing fisheries and integrating fishers' experiential knowledge into marine science and management continues to increase. However, relatively less effort is devoted to developing novel methods to include results from social and economic models or surveys in stock assessments and fishing opportunities advice.

This theme session provided an opportunity to show the benefit of joint knowledge production between biologists, economists, and other social scientists, with the aim to use social and economic data to inform stock assessments and fishing opportunities advice. Human dimensions information could potentially improve fishing opportunities advice in multiple ways, so the session conveners welcomed all submissions that integrate human dimensions in the inputs to and outputs from stock assessments and/or in fishing opportunities advice and evaluate or demonstrate the added value of such integration for successfully addressing fisheries management challenges.

Session structure

The session built on 17 oral presentations and 10 posters with flash presentations (two minutes each), covering 4 broad research areas focusing on: (i) collecting and synthesizing data on social and economic aspects of fisheries systems; (ii) modelling fisher behaviour at multiple scales; (iii) integrated scenario analyses; and (iv) leveraging social science (including economics) in the advisory and governance domains. The session was structured in two half days, where the first half day was dedicated to presentations and discussions under topics (i) to (iii), followed by an interactive discussion. The conveners asked all participants in attendance to work in small groups to identify the biggest challenges of moving beyond biological and catch information to include social and economic considerations in the provision of fishing opportunities advice. The second half-day session was dedicated to presentations and discussions of topic (iv), followed by a second interactive session employing liberating structures techniques¹. All participants were engaged individually and as part of randomly assigned groups to identify 11 top-rated ideas for how to incorporate social and economic dimensions in fishing opportunities advice.

Key results

Presentations

Session presentations highlighted case studies for integrating human dimensions data in stock assessments and advice, and showcased innovative approaches of how social and economic information has influenced advice in quantitative and qualitative ways, as well as what needs to

¹ <https://www.liberatingstructures.com/ls-menu/>

happen to incorporate social and economic data in stock assessments and advice, and what barriers are preventing further integration.

(i) **Social and Economic Data Collection:** Presenters discussed their work on collecting data characterising fisher experiential knowledge. Fishers are witnessing changes in the social-ecological system first hand, which could be extremely valuable for increasing the sample size of dedicated monitoring efforts. However, issues were identified with sustaining this knowledge collection, including stakeholder fatigue. Participants discussed the need for in-depth qualitative information gained from informal conversations alongside more systematic and standardised data collection protocols to jointly inform policy.

(ii) **Fisher Behaviour Modelling:** The next set of presentations focused on understanding fishing decision drivers and incorporating that knowledge into models of fisher behaviour. Fishers may modify their fishing activity depending on a number of factors such as weather, distance from port, bycatch, incentives to cheat the regulations, and the number of other fishing boats present. Speakers and discussions with the audience highlighted the value of these models to show that it is difficult to "standardise away" biases from fisher behaviour, and showed the importance of ground-truthing model results using discussions with stakeholders.

(iii) **Integrated Scenario Analysis:** In the final session on Monday, speakers discussed the pros and cons of maximising sustainable versus economic yield using a fútbol metaphor. Presenters emphasised the importance of incorporating interactions between ecosystem, biological, and human dimensions systems in forward projections, which is especially effective when conducted by interdisciplinary teams, and requires dedicated efforts and "coaching". In order to use these methods in management rather than academia alone, we need to demonstrate wins. Concerns were expressed regarding the aging of the fleet for the future sustainability of fisheries as well as the complexity of modelling international scenarios.

(iv) **Advice and Governance:** Presentations during the Thursday session focused on approaches for using social science to improve the scientific advice for fisheries management and the ability of the fisheries governance system to accept and act on this advice. Notably, some participants called for demonstrative case studies where the integrated advice has been accepted by managers, but management timelines can be limiting for complex bioeconomic modelling efforts. Attendees also discussed the importance of improving catch allocation decisions by considering issues of social equity and fishers' ability to adapt to changing regulations.

Interactive discussion sessions

Participants in the first interactive discussion session identified 27 challenges of moving beyond biological and catch information to include social and economic considerations in fishing opportunities advice. The conveners later transcribed and categorised each challenge into thematic groups (Table 1). These thematic groups were phrased as action statements to convey what needs to change in fisheries science and management practices to make progress towards transdisciplinary catch advice. The thematic group with the highest number of challenges was for increasing capacity for transdisciplinary work; participants identified challenges under this theme related to building trust amongst stakeholders and scientists with different expertise, and avoiding stakeholder fatigue.

Thematic group	Number of individual challenges in theme
Increase capacity for transdisciplinary work	7

Invest in social science data collection	4
Demonstrate added value of including human dimensions and improve communication of this with stakeholders and managers	4
Change the fisheries management process	3
Change the advice process to be transdisciplinary	3
Incentivize fisher participation in management	2
Change the science process to be transdisciplinary	2
Improve communication across disciplines	1
Develop methods to better integrate human dimensions data in quantitative models	1
Total	27

Table 1. Summary table showing the number of challenges including social and economic considerations in fishing opportunities advice identified by groups of participants during the first interactive discussion session, categorised by theme.

The closing interactive session used ‘the wisdom of the crowds’ to identify 53 distinct ideas (one per participant) to incorporate social and economic dimensions in ICES fishing opportunities advice. Through an interactive scoring process², participants selected the top 11 ideas for advancing the incorporation of human dimensions in ICES catch advice. The top 11 ideas were then further developed through small group consultancy³. After the session, we categorised these ideas into similar ‘action statement’ thematic groups that we used for the first interactive discussion session (Table 2).

Thematic group	Number of individual ideas in theme	Number of top 11 ideas in theme
Change the advice process to be transdisciplinary	15	4
Demonstrate added value of including human dimensions and improve communication of this with stakeholders and managers	14	2
Increase capacity for transdisciplinary work	6	2
Incentivise fisher participation in management	6	1
Prioritise which advice problem to solve	3	1
Develop social/economic management decision tool	3	1
Develop methods to better integrate human dimensions data in quantitative models	2	-
Change the science process to be transdisciplinary	1	-
Change the catch allocation process to be transdisciplinary	1	-
Change the fisheries management process	1	-
Do not focus on this topic	1	-

² Method: Liberating Structures – [25/10 Crowdsourcing](#)

³ Method: Liberating Structures – [Wise Crowds](#)

Total	53	11
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Table 2. Overview of the number of 53 individual ideas including top 11 to incorporate social and economic dimensions in fishing opportunities advice, grouped by theme.

Table 2 shows that the key action areas for integrating social and economic dimensions primarily align with the closely related topics of "Changing the advice process to be transdisciplinary," "Demonstrating the added value of incorporating human dimensions and improving communication of this with stakeholders and managers," and "Increasing capacity for transdisciplinarity". These topics also reflect the key action areas for the 11 highest-scoring ideas. Table 3 provides an overview of these top 11 ideas, including detailed elaboration following consultancy discussions in smaller groups, listed in order of scores.

Conclusion

Session K on 'Incorporating human dimensions to improve fishing opportunities advice' saw high engagement in terms of presentations, posters, and audience participation. Presentations and posters described experiences in incorporating social and/or economic dimensions in fishery data collection, models of fisher behaviour, integrated scenario analyses for alternative management approaches, and fisheries scientific advice and governance. Open discussion sessions following each topical group of presentations facilitated audience engagement with speakers and group identification of ideas and challenges for how to move forward. Discussion points were raised about the need to demonstrate successes with including more human dimensions information in fisheries governance, not just in academia. Concerns were shared about the complexity of internationally managed fisheries, the variability across regions in capacity to integrate new information, and the slow adaptability of our current systems.

The interactive discussion sessions led to the identification of top-rated thematic areas for concrete actions (Table 3). As an ICES community, we need to increase our capacity for transdisciplinary work that demonstrates the added value of including human dimensions in fisheries management and working with stakeholders and managers to build trust. We also need to look critically at our fisheries advice and governance systems to allow for transdisciplinarity and demonstrate to stakeholders how producing integrated advice could help improve the social and economic outcomes of fisheries management decisions.

Score	Idea	Thematic group
22	Develop process to pay fishermen for their knowledge/time for them to be engaged, be interviewed, attend meetings/workshops. (We pay for biological sampling, why not for human sampling?). Don't blame the player, look at the rules of the game. Change the game master.	Incentivize fisher participation in management
20	Hire more transdisciplinary scientists to work with fishing sector. >> <i>How can we make this happen?</i>	Increase capacity for transdisciplinary work
20	Co-creation of advice >> <i>Can we co-create advice (and how) for a small-scale fishery in Mediterranean waters that is overexploited and needs a multiannual plan to recover fishery while maintaining the fishery Social-Ecological System?</i>	Change the advice process to be transdisciplinary
20	Define what dimensions of fishing opportunities advice we want to target >> <i>What dimensions of "fishing opportunities advice" do we actually work on, how do we define it?</i>	Prioritise which advice problem to solve

20	Incorporate economics in Management Strategy Evaluations may pique the interests of advice requesters >> <i>What does ICES need to develop to move this forward?</i>	Increase capacity for transdisciplinary work
20	Fishing advice should be treated as a whole system approach. Then automatically these social and economic elements will be included because they are an integral part of the whole system.	Change the advice process to be transdisciplinary
20	Better communication, including risk and uncertainty, of catch options and their influence on society and economy in fisheries advice.	Demonstrate added value of including human dimensions and improve communication of this with stakeholders and managers
20	Bring social/economic scientists and fishery managers into ICES science meetings >> <i>How to identify funds? What are the questions (we) ICES want these groups to answer for us? How do we go about pulling this list together?</i>	Change the advice process to be transdisciplinary
20	Build in a social/economic loop in the Advice Drafting Groups - include people trained for this. >> <i>How to implement the idea of integrating social/economic expertise in ADGs?</i>	Change the advice process to be transdisciplinary
19	Find one example where it has been done (there were a few examples presented) and repeat in another situation. >> <i>How to make a case study happen?</i>	Demonstrate added value of including human dimensions and improve communication of this with stakeholders and managers
19	Writing a parallel advice sheet with socio-economic implications (trade-offs) from a given advice (TAC, quota, etc.); a management decision tool (or framework) >> <i>Build tools to visualize social and economic impacts for managers and policy makers to use in their decision making.</i>	Develop social/economic management decision tool

Table 3. The top 11 ideas to incorporate social and economic dimensions in fishing opportunities advice, in order of highest score, following elaboration in consultancy groups. Maximum possible score: 25; minimum: 5; 11 consultancy groups of approximately 5 people each; original idea before arrows (>>); in italics following arrows is an elaboration (where applicable).