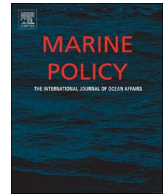




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Stakeholder perceptions in fisheries management - Sectors with benthic impacts

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ABSTRACT

The capture fishing sector causes direct and indirect impacts on benthic habitats and associated fauna and flora. Effectiveness of new mitigation measures depends on fishermen's perceptions; their acceptance of, and compliance to, those measures. Accordingly, by means of Advisory Councils (ACs), fisheries stakeholders are encouraged by the Common Fisheries Policy (CFP) reform to contribute to policy formulations. Still, the CFP reform remains unclear about how to possibly incorporate perceptions of specific conservation measures and objectives in practice. Against this background, this article aims at exploring a systematic multi-criteria approach that provides information about stakeholder preferences for objectives reflecting on what is more important to aim for ('what'), mitigation measures as strategies for reaching their objectives ('how'), and accountability options that can enhance trust in the people who carry out management ('who'). The approach applies a pairwise comparison approach to elucidate the stakeholder preferences, and to estimate the relative importance of the different options. It is conducted in the Black Sea, the Mediterranean Sea, the Baltic Sea, and the North Sea. The outcomes of the questionnaire survey succeed in transparently reflecting a diversity of preferences. It is advised that in order to inform the CFP, the ACs develop a user-friendly attractive online version of this approach that can reach multiple stakeholders across Europe and facilitate updates on a continuous basis. In this way the ACs could better facilitate bottom-up participation in fisheries management by representing a wide range of stakeholder perceptions.

1. Introduction

The mobile, bottom-contacting gears currently applied in the fishery sectors across Europe are increasingly criticised for having a large impact, both directly and indirectly on the benthic habitats and communities [1–4]. Direct impacts entail direct change in population dynamic parameters such as mortality, growth, reproduction, distribution, density, and abundance patterns of target and bycatch fish and shellfish species as well as benthic invertebrate communities and habitats. Other direct impacts are physical impacts, i.e. abrasion, on the benthic habitats and their physical structures. Indirect impacts include derived changes in species or food web interactions, long term changes caused by changed water turbidity and sedimentation, e.g. long term influence

on recruitment, nursery and feeding habitats, etc. Additionally, the indirect impacts involve discards in relation to changes in food web interactions in high discard areas caused by the fishery. In a study comparing beam trawlers with demersal otter trawlers, gillnet, and sandeel fisheries in the German Exclusive Economic Zone of the North Sea, it was estimated that risks for direct effects in terms of mortality and disturbance effects are highest per unit of surface area swept for beam trawlers [5]. More specifically, different gear footprints can be distinguished for individual gear components, such as beam shoes, tickler chains, trawl doors, sweeps, and ground gear [7]. In research conducted by Kaiser et al. [4] it has been found that the benthic impacts of trawling not only depend on gear characteristics, but also on the bottom habitat types. The bottom-types can consist of different types of

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sand, mud and/or coarse sediment habitats, which have different physical and biological capacities, characteristics and sensitivities to impacts.

The Common Fisheries Policy (CFP) reform encourages an ecosystem based approach, in which benefits from living aquatic resources are ensured ‘while the direct and indirect impacts of fishing operations on marine ecosystems are low and not detrimental to the future functioning, diversity and integrity of those ecosystems’ [8–11]. Correspondingly, the CFP reform proposes a new general framework to manage EU fisheries, focusing on multiannual plans as a main tool to plan and define management goals for fish stocks, functioning as a roadmap for achieving sustainability objectives to preserve marine biological resources [8]. While the Member States have the ultimate responsibility for the formulation of plans (multiannual plans or discard plans), the Commission can draw up a plan if judging the plans of the Member State insufficient [10].

Previous lack of flexibility and adaptation at the EU level by means of top-down micro-management has been acknowledged in the reform of the CFP. Accordingly, the CFP reform stresses that to ensure good governance, appropriate involvement of stakeholders is needed to implement measures [8,12]. Stakeholders of the fisheries now contribute through the regionally based Advisory Councils (ACs) to formulate policies, and fisheries administrations are more closely linked to the regional problems. Notably, recommendations and advice provided by the ACs have no legal status in terms of implementation, but are limited to advising Member States and the Commission [10,13]. As such, the CFP reform remains unclear about how to involve stakeholder perceptions in fisheries management in practice.

Against this background, this article aims at exploring a systematic multi-criteria approach for identifying stakeholder perceptions concerning possible mitigation measures, sustainability objectives and accountability options in fisheries management, targeting sectors with benthic impacts. In particular, by means of a questionnaire survey conducted for the FP7 European project BENTHIS,¹ the intention is to identify stakeholder preferences of fishermen, fisher representatives, other private companies, civil society, government, science, and others, across four regions of Europe including; the Black Sea, the Mediterranean, the Baltic Sea and the North Sea. The importance of consulting with stakeholders is enhanced with this article, in accordance with one of the core intentions of BENTHIS, which is to: “develop in consultation with the fishing industry and other stakeholders on a regional scale, sustainable management plans that reduce the impact of fishing and quantify its ecological and socio-economic consequences”.

This article first introduces the systematic multi-criteria approach on how to conduct stakeholder surveys in Section 2, and follows up with presenting identified options for mitigating benthic impacts of fisheries in Section 3. The results of stakeholder preferences identified in the four regions are presented in Section 4. In Section 5 the results are discussed, followed by concluding remarks in Section 6.

2. Methodological approach

Stakeholder perceptions in fisheries management can be shaped through at least three different channels; (1) preferences for objectives reflecting on what is more important to aim for (‘what’), (2) preferences for mitigation measures as strategies for reaching their objectives (‘how’), and (3) trust in the people who carry out management (‘who’). In other words, stakeholder perceptions in fisheries management not only refer to ‘what’ they prefer, but also to ways in which mitigation measures are carried out, i.e. ‘how - and by whom’. Multi-criteria analyses encompass a set of tools designed to deal with multiple dimensions of a problem, and can address multiple objectives, mitigation measures and accountability by assigning weights [14–19]. The method

essentially follows the initial part of an Analytical Hierarchical Process (AHP) [16] which; identifies relevant criteria, arranges them into value-trees, and conducts a pairwise comparison technique to assign relative importance, i.e. weights. While an AHP proceeds with impact assessments to judge on alternatives by means of combining the weights with impact scores in advanced mathematical manners, this is not what the multi-criteria approach is aiming for in this study. Instead, here emphasis is put on involving multiple stakeholders to assign preferences, i.e. weights, as an outcome of the survey.

The systematic multi-criteria approach follows the following four main steps (adapted from [15,16,17,18])

- 1) Identify relevant stakeholders;
- 2) Identify relevant options and arrange them into hierarchies;
- 3) Design a questionnaire survey with pairwise comparisons based on options in the hierarchies;
- 4) Estimate relative importance for each option, across different stakeholder groups.

First, relevant stakeholders were identified. The numbers of stakeholders who filled in the questionnaire varied across case studies, with a total of 121 respondents, of which 26 contributed in the Black Sea, 44 in the Mediterranean Sea, 13 in the Baltic Sea and 38 in the North Sea. Whereas all the respondents in the Black Sea are from Turkey, the nationalities represented in the Mediterranean belong to Greece (55%) and Italy (45%), in the Baltic Sea respondents are from Denmark (54%) and Sweden (46%), and in the North Sea they are from Belgium (47%) and the Netherlands (53%). The response rate is hard to judge, as the questionnaire link was not only addressed to individuals directly, but also indirectly, for instance, in the Netherlands by means of newspapers and networks. It was noted that in the North Sea and the Baltic Sea, the fishermen in particular were sometimes hesitant to contribute.

In Table 1 the numbers of stakeholders who contributed have been listed by category in each of the four case studies; including fishermen, fisherman representatives, other private companies, civil society, governmental officers, science and others.

The stakeholder responses indicate attitudes that are relevant for the different groups. These attitudes may not be fully representative for the groups as this survey is not based on the idea of a statistical representative sample. However, main players are still included, i.e. people with formally assigned representative tasks, and as such the stakeholders provide views that are relevant to group opinions.

Second, the method is based on a multi-criteria approach, including an initial problem structuring phase generating a set of alternative management options and a set of criteria, followed by a phase with assessments by means of stakeholder priorities [14,16,17]. The experts in the BENTHIS FP7 project have identified *what* the relevant options are. In particular, the case study leaders of the Black Sea, the Mediterranean Sea, the Baltic Sea and the North Sea played a central role in defining what options should be included. The options included in the survey were identified in a two-step approach. At first, BENTHIS researchers discussed and identified preliminary options in a workshop. The outcome was a final list of options belonging to three categories identified as: (1) viable mitigations to benthic impacts of fisheries, (2) sustainability objectives, and (3) accountability options [20]. Secondly, after the most general options were identified, more specific options were discussed with the participants in follow up conversations face-to-face, by telephone and by emails. The general and the specific options were arranged into so-called hierarchies (see Figs. 2 and 3, and first column in tables in Appendix 1). Notably, levels in a hierarchy are not related to levels of importance but only to levels of specification. Presentations of options in hierarchies facilitate an open and transparent consideration of all relevant aspects and assist by informing and structuring different arguments during a conversation [18].

Third, the questionnaire survey is aiming at identifying different stakeholder preferences across case studies and groups of stakeholders.

¹ <http://www.benthis.eu>.

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