



Providing incentives for fishermen through rights-based co-management systems. An impact-assessment on Basque fisheries



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ARTICLE INFO

Article history:

Received 24 February 2016

Received in revised form

13 April 2016

Accepted 17 April 2016

Keywords:

Common Fisheries Policy

Governance

Impact assessment

Incentives

Co-management

ABSTRACT

This research examines the social, economic and coercive incentives provided by fisheries management measures. Qualitative information was collected through interviews, and focus groups were organized to gather knowledge from regional stakeholders, to provide regional and European authorities with empirical evidence of the perceived legitimacy of current and future management measures under different co-management systems. Legitimacy greatly influences fishermen's behavior and therefore compliance. Qualitative and quantitative information are combined in an impact-assessment analysis to identify bio-socioeconomic impacts of different management measures on the fishing activity, under the current Common Fisheries Policy, in the medium and long term. The results will help regional and European authorities define new management measures aimed at providing the right incentives to achieve the results. This paper demonstrates the necessity of introducing management measures that combine the various types of incentives mentioned.

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1. Introduction

Many problems have remained unresolved since the previous reform of the Common Fisheries Policy (CFP) when considering the unsuccessful results of a wide range of management measures implemented [1–4]. The main question behind this study is the issue of why fisheries management has failed and which management measures fishermen feel most able to implement. This paper provides insights into the way new management measures should be formulated in order to be considered as real mechanisms for sustainable fishing activities within a consensual framework agreed to by all stakeholders. Sustainability implies setting and reaching multi-disciplinary objectives able to address ecological, economic and social targets [5]. Moreover, institutional sustainability [6] is also needed to guarantee these objectives. Many fishermen and scientists claim that today's institutional model gives the wrong incentives, which is why they argue in favor of more closely integrating the industry into the management of the resources [7]. Knowledge of how the agents involved in the regulation perceive the measures has been undervalued when in fact it should be the cornerstone of successful management strategies [8]: a perception of increased legitimacy in fisheries management can lead to greater compliance [9]. Specifically, this paper identifies those incentives that new management measures could

provide. Social, economic and coercive incentives play a key role in compliance and therefore the expected biosocioeconomic results. This research combines qualitative and quantitative techniques to analyze current and emerging management measures in the context of the new CFP (Regulation (EU) No 1380/2013), incentives for fishermen, and their behavioral responses to these. Moreover, it places the emphasis on management measure governance, i.e., how these incentives are achieved in local and regional contexts. One of the major recent trends in the fishing sector has been the increasing role of fishermen's organizations [10]. In the case of the Basque country (Spain), fisheries institutions play a key role in the day-to-day fishing activity. The pelagic fleet is organized under the umbrella of the *cofradías*, ancient institutions representing the interests of fishermen (boat owners and crew members), which centralize the trading of the fish caught by their members, among others. In turn, producer organizations (PO) group together industrial trawler owners. *Cofradías* now under the umbrella of the PO in order to access the powers provided to POs by the EU legal framework. Once the management measures have been well defined in terms of objectives, incentives, fishermen's perceptions, governance model, and other external factors, this paper examines the impact of these measures. The research simulates management measures and involves impact assessments (IA) based on this integrated framework in order to show the ecological, economic and social effects of the various scenarios selected following a dialogue between stakeholders and scientists. Finally, management measures are rated according to their biosocioeconomic effectiveness, economic efficiency, the fishermen's acceptance of the management measures, and their coherence according to the already-established management

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plans for the different stocks and fisheries. This approach enables us to recommend operational management measures that can create suitable incentives for tackling the main structural failings observed since the previous CFP reform. The work includes a specific regional case study involving Basque purse seiner and trawler fisheries under the umbrella of Spanish governance regulations. This case study was developed in the context of the European research project SOCIOEC¹ which is an interdisciplinary, Europe-wide project bringing together scientists from several fisheries sciences with industry partners and other key stakeholders.

The paper is structured as follows: Section 2 lays out a conceptual approach to developing impact assessment; Section 3 describes the Basque case study; Section 4 explains the methods; Section 5 presents the management measures to simulate and the external factors considered; Section 6 deals with the main results from the simulations; and finally, Section 7 presents the discussion and main conclusions.

2. Links between science, stakeholders and managers: a framework for impact assessment

This research establishes a close link between science (IA of different management measures), stakeholders (potential incentives and the behavior of fishermen), and manager (s - including governance issues). Within this framework we have performed a qualitative-quantitative IA in which the qualitative analysis provides arguments for understanding the failure or success of adopted management measures based on the creation of incentives and the behavior of the fishermen themselves. When management measures provide suitable incentives, successful results are usually attached to those measures [4]. Three types of incentives have traditionally been considered in fisheries: economic, coercive and social. The first are given when fishermen expect to increase their revenue from the activity. Coercive incentives may arise when European/national/local administration introduces a sanction for non-compliance. Finally, social incentives exist when fishermen have the opportunity to be involved in the decision-making process. In this sense, this paper analyses the impact of managing individual rights in a common-pool supported by *cofradías* and POs, implying that some stages of the management system are decentralized to POs. Thus, the social incentives structure is, in fact, related to the governance system adopted and, in particular, the type of co-management techniques [11] utilized by the stakeholders involved. The general objective of this paper is to provide empirical evidence of the need to introduce management measures that combine these different types of incentives to promote sustainable fishing [12]. The definition of multi-incentive management measures contributes to overcoming some of the main structural failings of the latest CFP, especially in relation to the lack of consensus about the prioritization of objectives, the short-term view, the top-down management structure that should be removed from the decision-making process, and the low level or even lack of compliance with the regulations.

3. Case study

The Basque Country (northeastern Spain) is characterized by multi-fleet and multi-species fisheries fishing in different areas. This paper analyses the main fleets with base port at the Basque Country: the trawler and purse seiner fleets. Fisheries institutions are hugely important in the Basque Country: purse seiners are organized under the umbrella of the *cofradías* [13], and industrial

Table 1
Basque fleet characteristics.

Fleets	Trawlers	Purse seiner
ICES sub-areas ^a	VI, VII and VIII a, b, d	VIIIabce and VII.
Number of vessels ^a	34	58
Average length (m) ^b	38	32
Average power (kw h) ^b	461	467
Employment (people) ^b	420 (13 fishermen by vessel)	696 (12 fishermen by vessel)
Main target species ^a	Hake, anglerfish and megrim	Mackerel, anchovy, blue-fin tuna, albacore, sardine
Landing (tons) ^a	9131	16,600
Annual revenue (M€) ^{a+b} (average of years 2007:2009)	39	29

Source:

^a Logbooks and sales notes.

^b Statistical information collected by the Basque Government through annual surveys of the fishing sector. Data of years 2007–2009.

trawler owners are grouped into POs. A revision of the co-management system in Western Waters including a detailed description for the Basque fleet and fisheries can be found in Le Floc'h et al. [11]. The technical characteristics and some economic results are presented in Table 1. The trawler fleet comprises bottom otter trawlers and bottom pair trawlers [14] which operate in fisheries² mainly managed through TAC (Total Allowable Catch) and TAE (Total Allowable Effort), enforced by various governmental agencies. Access rights were imposed on the Basque trawler fleet in 1981 ([15,16]). Subsequently, in 1992, these rights became accumulative, and few years later, in 1997, the rights became transferable³ with limitations. Finally the current Individual Transferable Quota (ITQ) system⁴ was established in 2006 [17]. The Basque purse seiner fleet operates sequentially, distributing its activity across the mackerel, anchovy and tuna seasons, shifting fishing gear to pole and line (using live bait) and trolling in the tuna season. The main species targeted by the Basque purse-seiner fleet are regulated through TAC [18], although recently, individual fishing rights have been introduced to manage bluefin tuna (BFT) and mackerel.

The vessels of the trawler and purse seiner fleets are heterogeneous, for which reason the fleets have been split into segments. The trawler segments are otter trawler, (Sg1), pair trawler, (Sg2), and longliners (Sg3), with the main target species being hake (Sp1), megrim (Sp2), mackerel (Sp3), horse mackerel (Sp4), and anglerfish (Sp5). For purse seiners, four segments are defined: pure purse seiners (Sg1), purse seiners and trolling (Sg2), purse seiners and live bait with high BFT catchability (Sg3) and purse seiners and live bait with low BFT catchability (Sg4) representing, over the whole Basque purse seiner fleet size, the 40%, 19%, 5% and 36% respectively. Their main target species are anchovy (Sp1), horse mackerel (Sp2), mackerel (Sp3), sardine (Sp4), albacore (Sp5), and BFT (Sp6).

4. Management measures impact assessment: method and data

The IA method (EU, 2009), which follows the conceptual approach introduced in Section 2, was developed in the three generic

² A fishery is a group of vessel voyages targeting the same (assemblage of) species and/or stocks, using similar gear, during the same period of the year and within the same area (study group on the development of fishery-based forecasts, ICES, 2003). The location does involve the definition of a fishery (Prelezo et al., [15]).

³ Royal Decree 1915/1997.

⁴ Order APA/3773/2006.

¹ <http://www.socioec.eu/>.

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