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Gear liberalization in the Northeast Arctic cod fisheries – Implications for sustainability, efficiency and legitimacy

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ABSTRACT

In Norwegian fisheries policy, strict gear regulation is a central instrument actively used to achieve fisheries political objectives. Gear regulations are locked in rigid regulative structures that limit the actors' ability to adapt practices to changing conditions. This article shows that gear liberalization could take place within the framework of sustainable resource harvest, while also contributing to improved economic efficiency and reduced greenhouse gas emissions. Institutions, such as gear regulations, do not exist in a vacuum, but are linked to other institutional structures. Hence, within a framework of sustainability, the relaxation of one regulation may induce new regulations and institutions.

1. Introduction

At the Norwegian Fishermen's Association's (NFA) annual national congress in 2009, the sitting Minister of Fisheries addressed the need for increased efficiency to ensure more environmental friendly fisheries. While the solution to efficiency problems is usually seen in terms of changing the configuration of the quota regime [1,2], the minister focused on efficiency improvements through liberalization of the strict fishing gear regulations [3]:

> *Today's strict fishing gear regime can be an obstacle for more energy effective fishing methods. Within the framework of sustainable resource management, each fisherman should be free to choose the type of fishing gear that suits him best (author transl.).*

Intuitively, the minister's liberalization perspective can be seen as portraying an isolated and simple connection between fuel consumption and fishing gear adaptations.

However, gear and vessel regulations relate to a number of aspects of a management regime. Fisheries technologies may affect the composition of fish stocks, seasonal catch patterns[1], fuel consumption and the technical mobility of the fleet [7–9]. In a value chain perspective, technology also affects the relationship between the fleet and the processing industry and thus how we organize the sector in regards to export markets [10].

In the last five decades, as a result of technological advances, catch capacity of the fishing fleet has had a significant increase. According to Bjordal [11:21] "Catch capacity is the product of the fishing effort and the combined efficiency of the fishing gear and the fishing vessel…" Technological advances have led to increased gear efficiency. In gillnet fishing; the efficiency has increased due to the introduction of synthetic fibers (nylon) and less visible monofilament thread. Vessel size also contributes to increased catch capacity, as larger vessels may carry and operate a larger number of net units. Similarly, in longline fishing, larger vessels are able to carry more hooks, line and bait. Small open vessels may, for instance, fish with a few hundred hooks, whereas the largest longline vessels may operate as many 50–60 km of longline and 40 to 50,000 hooks per day. In addition, increased vessel size is usually linked to a higher degree of mechanization through the use of power hauler or baiting machines, which also affect efficiency [11].

A result of the increased catch capacity is the pressure it has put upon the world's fish resources. Subsequently, various technical regulations have been enforced with the aim of controlling catch capacity. The objective of technical regulations is primarily biological, but is also assumed to contribute with economic benefits [12]. Although this article is set in the Norwegian setting, technical regulations, specifically vessel size or fishing gear restrictions, are not unique to Norway, but are commonly found in many western, industrialized fisheries nations. For instance, the Dutch beam trawl fleet has been subject to a number of input and output controls; two of them being regulations on mesh size and beam length [13]. In Denmark specific gear types are excluded

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[1] Several studies have shown that fishing gear affect quality, and thereby, the price of fish. Two recent studies showed that longline fetched fish receive a higher price than fish caught with other types of gear. This is mainly ascribed to the perceived higher quality of longline caught fish [4,5]. Thus, differentiated pricing, due to quality differences, is likely to affect harvest patterns. As a longline skipper said: "During fishing, there may also be a need for price information. Then I can decide whether to go for larger or smaller fish. I know from experience where to find these [6].

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from certain areas, there may be limits on engine power in some areas and vessel quotas are in some fisheries based on vessel size [14]. Greenlandic shrimp fishery has a quota system based on technical capacity through limitations put on vessel size and gear [15].

In this manner, specific technologies shall contribute to the fisheries political objectives, such as sustainable resource utilization, a viable economy and maintenance of a diverse fleet structure to secure employment in fisheries dependent regions [16,17]. As the Norwegian fisheries objectives are framed within a fixed resource allocation regime that shall secure equity and social sustainability, an array of technical regulations, restricting vessel size and gear use has been introduced. Consequently, with reference to how gear regulations are connected to broad-based management goals, the ministers' liberalization approach represented a bold break with fixed perceptions of how to regulate fishing gears and a challenge to the description of a well-functioning management regime [18].

In a Norwegian, historic perspective, the introduction of strict gear regulations started back in the 1960 s, when a system of licence regulations for the deep-sea fleet was introduced [19]. This was followed a decade later by the establishment of the Participation Act in 1972. These measures allowed for a strict regulation of the numbers of deep-sea trawlers and purse seiners. Furthermore, in 1989 the Northeast Arctic (NEA) cod stock collapsed, resulting in the introduction of total allowable catch (TAC) quotas, limited entry and individual vessel quotas (IVQs). Although the deep-sea fleet had been subject to regulations since the 1960 s, the new resource management regime included the coastal fleet as well. Through the new resource management regime, annual quotas were to secure biological sustainability and the allocation system allocating quotas between gear and vessel groups were to secure social sustainability [20].

To fulfill specific policy aims, strict gear and vessel regulations became a centre piece in the design of the new quota regime. Moreover, as the allocation regime shall ensure stability and predictability, it is based on predefined allocation keys, which locks fishing gear adaptation to an array of strict regulations, which in turn affects the fishers' operating pattern and overall performance. In r the NEA cod fisheries, for example, significant differences in the economic performance between different gear and vessel groups and between regions are observed [21].[2]

Most of the deep-sea fishing gear and vessel regulations were introduced at a time when there were no quota restrictions, which gave incentive for gear efficiency improvements and unlimited catch rates. The introduction of the quota regime, however, limited this effect. In addition, an array of technical regulations such as trawl-free areas, selectivity devices, minimum mesh sizes, bycatch regulations and so on, have also become parts of the management regime. Thus, to solve new challenges, such as overcapacity efficiency, greenhouse gas emissions and adapt to ecosystem-based management, many fishers have demanded more liberal gear regulations, which is also supported by the Institute of Maritime Research [28].

However, liberalization of gear regulations is controversial. Although the supporters claim flexibility and deregulations as the key for increased efficiency, new innovations and more environmental friendly fisheries; the opponents fear the effects upon fish resources, the resource allocation regime and see it as a threat to the maintenance of a diverse fleet structure [29].

The point of departure in this article is the Norwegian quota allocation system that allocates fish resources between gear and vessel groups based on a fixed allocation system, which divides the cod quota according to a predefined system between the trawler and the conventional fleet[3] [30,31]. The system allots a degree of predictability, but also contributes to a specific harvest pattern, which for the NEA cod has proven to be sustainable [32]. Thus, the first question is whether a change in gear adaptations, as a result of liberalized gear regulations, may push the NEA cod stock harvest beyond the limits of responsible resource management? The second question is whether freedom to choose fishing gear represents potential economic efficiency gains and will contribute to a reduction in the fleet's fuel consumption? The third question is whether liberalization of gear regulations may affect the legitimacy of the present allocation regime? And the final question is whether gear liberalization will have institutional implications and if the changes will demand a new regulatory regime[4]?

This article is organized as follows: in section two the theoretical framework is outlined, with special emphasis on regulative institutions. Section three describes the central elements of the management regime and how relevant policy aims are expressed in the legal framework. Section four presents the empirical findings of liberalization of fishing gear regulations. Section five discusses the future implications of gear liberalization upon the resource allocation regime and whether liberalization will lead to new management aspects.

2. Theoretical framework

The basic premise for restricting fisheries rests on Gordon's paper on the economic theory of common-property resources in the fisheries [33]. This was the first effort to apply a systematic economic analysis to the fisheries [34] and purports that as fisheries resources are common resource, rather than private property, economic inefficiency and overfishing are unavoidable. “Everybody's property is nobody's property“ [33]. Gordon was followed by Hardin in 1968 in the *Tragedy of the Commons* article [35], which claims that open access resources combined individualistic rationality and natural variability produces uncertainty. The result is a race for fish and overfishing Fishers overfish because it is rational to do so. The commons were seen as a form of market failure to which closing of the commons through state intervention or introduction of private properties was the solutions to avoid “the tragedy of the commons“ [36].

According to Hughes [37], to understand the rationale for governing harvesting technologies in fisheries, studies of technologies should technology, but also institutions. This approach emphasizes how social relations, for example, institutions, surround technology and affect the nature of technology, which in turn affects society. Institutions may be seen as regulatory mechanisms and can be portrayed as *cognitive, normative* and *regulative* structures that influence the practices of individuals and organisations [38,39]. While the cognitive and normative institutions focus on how we classify objects and the values involved, this article focuses on the *regulative structures* of institutions. Thus, strict gear regulations are seen as a reflection of the institutional framework of the management system, which define problems and propose solutions to the problems [40].Thus, institutions may significantly affect the actors' technological adaptations. In addition to defining solutions to specific problems, institutions shall also address sector policy objectives [41].

According to economic theory, the introduction of institutions and the transition towards a political-administrative regime might be seen as a response to possible market failure that requires public

[2] In terms of technical efficiency, large variations have been found between fisheries [22–25], but also within fisheries [25–27].

[3] The conventional fleet consists of the vessels using gillnets, longline, Danish seine, pots, traps and jigging.

[4] The project “Consequences of flexible gear adaptations“ (2010–2012) financed by the Norwegian Seafood Research Fund (FHF-fondet) and a joint project between SINTEF Fisheries and Aquaculture, Department of Fisheries technology and The University of Tromsø, Norway.