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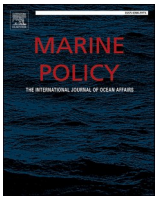

Caught in the environmental discourse—Coastal fisheries under pressure

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ABSTRACT

For decades, the Norwegian coastal fisheries have been defined as the most sustainable, compared to industrial, offshore fisheries. This is due to the low fuel costs involved in the nearshore fisheries, the relatively low investments required and the fact that the coastal fleet is decentralized, providing work opportunities along the entire coast. However, over time new actors, outside the fisheries domain, have brought new sustainability attributes to the environmental discourse. The new agenda goes beyond the traditional sustainability concept, which was closely related to single stock management. Today, reduction of greenhouse gas emissions, ghost fishing, plastic pollution at sea and a stricter quota control regime, have become central topics in the sustainability debate. Furthermore, sustainability labels from private certifying agencies have gained a strong position in defining sustainable fisheries, and hence, access to the best paying fish markets. Finally, the coastal fleet has been locked into a quota management regime which makes it difficult to utilize new green technologies. The new order puts considerable pressure on the traditional coastal fisheries. How the coastal fishers and the fisheries administration answer these challenges, will largely determine the future of this fleet. As described in the article, the answers have so far not been very convincing. This could turn the tables, favouring the offshore fleet, which so far has been more responsive to the new challenges.

1. Introduction

In Norway, the introduction of a fisheries management regime to secure long-term sustainability refers to an almost 50-year long history [1]. Since the establishment of the 200-mile exclusive economic zones (EEZ) in 1977, coastal nations gained national control over the fish resources [2]. Based on a scientific approach to resource management [3,4], the new order implied the introduction of annual total allowable catch quotas (TACs) to secure long-term biological sustainability. After years of conflicts among different vessel groups, the Norwegian Fishermen's Association (*Norges Fiskarlag*) and the state finally agreed to fixed allocation keys within a regime based on individual vessel quotas (IVQs) [5]. In addition, specific input regulations such as access restrictions and gear- and vessel size limitations were connected to different license regulations for the deep-sea and the coastal fleet, respectively. Likewise, the introduction of transferable quotas within the vessel groups in the IVQ-system, to avoid overcapacity and increase economic efficiency, is based on stable resource allocation keys. The main pillars of the regime are interconnected and constitute the basic elements of a complex management regime to secure sustainable fisheries. To achieve compliance with the regulations, the resource allocation system must be considered legitimate by most fishers, representing different vessel and gear groups [6]. Hence, changes in one of the main elements may play over and disturb the total balance of the management regime [7].

Despite the fragile complexity of the system, Gullestad et al. [8] describe the "Norwegian model" as successful. However, over time new elements of the sustainability concept has gained increased attention in the management debate [9,10]. The increased focus has attracted new actors and new attributes are brought on the agenda, which goes beyond the original core elements, which used to define "sustainability" in fisheries management [11]. While e.g., biological sustainability via the annual TAC-setting originally corresponded to a single species maximum sustainable yield (MSY) management, complex ecosystem considerations are now integrated in the management system [12]. During recent years, reduction of greenhouse gas emissions and plastic pollution at sea have become central topics in the sustainability discourse [13]. In addition, sustainability labels from private actors have gained a strong position in defining sustainable fisheries and hence access to global markets for fish products [14]. Furthermore, coastal zone

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management and increased competition to use coastal waters by other industries (fish farming, windmills, tourist fishing, etc.) have put pressure on the traditional coastal fisheries adaptations [15].

Within the NEA cod fisheries, the coastal fleet traditionally corresponds to vessels between 0 and 28 m. In principle, the coastal fleet is divided into two main regulatory groups, the major "closed group" (vessels are allocated individual vessel quotas (IVQ)) and the "open group" (part-time fishermen). The closed group is divided into four length-groups, according to vessel size and quota allocation schemes.[1] Coastal fisheries are defined as *the most sustainable*, compared to industrial, offshore fisheries. This is mainly due to the coastal fleets adaptation to the NEA cod spawning migration pattern during January – April each year. In this period, the NEA cod is easily available for the coastal fleet, and the fishery is characterized by day-fishing during intensive peak seasons.

In this setting coastal fishing with passive gears, represents a more sustainable catch profile, and low fuel costs compared to trawling and low investment costs. In addition, coastal fisheries are decentralized by way of local ownership, which in turn supports local value chains and provides work opportunities along the entire coast. Despite decreasing catch shares, the coastal fleet is considered the backbone of Norwegian fisheries since the 1930 s, [16]. Hence, with reference to the traditional core elements of the sustainability concept (biological, social and economic), "small" has for years been considered "beautiful". However, with the new political agenda and increased focus on environmental aspects of the sustainability discourse, the position of the coastal fisheries position is put under pressure. This article explains how, by focusing on five different discourses. Finally, we also address how management institutions, and the coastal fleet can adapt to and cope with the new challenges. While we are using the Norwegian fleet as a case, we believe that the challenges we are describing have a wider validity, affecting the relationship between coastal and offshore fishing fleets in many European countries.

It should be emphasized that this is an *exploratory* article, trying to show how the new discourses may affect not only the relationship between the coastal and the offshore fishing fleets but also the management measures used in the fisheries policies. We are not in a position to calculate the relative importance of each discourse. The ambition is to describe and analyze the classical conflict between small-scale (coastal) and large-scale (offshore) fleet, demonstrating how new discourses and new classifications may change not only the political climate, but also the material facts on the ground, such as vessel size and resource allocations.

The article is divided in six sections, where Section 2 deals with theory and methods, Section 3 offers a short historic background, and Section 4 describes the five most important discourses threatening the position of coastal fisheries. Section 5 contains the discussion and finally, Section 6, the conclusions.

2. Theory and methods

This article is based on four key concepts, which will be shortly explained in the following: *fisheries regulations, institutions, framing* and *discourses*. According to Mitnick [17], the concept of regulation can be defined as "the intentional restriction of a subject's choice of activity, by an entity not directly party to or involved in that activity". That means that the act of interference itself makes a difference to the interferer (the *regulator*) as well as the subject of interference (the *regulatee*). Furthermore, the actual act of interference must be intentional and not a by-product of some other activity. This does not preclude that regulations may have unanticipated consequences [5]. This definition may give the concept a certain static character, but the practice of regulation points to the *process* of regulating, which comprises the establishment of regulations, the changes over time, the administration and the enforcement of regulations.

Regulations on how to perform fisheries have a long and distinguished tradition in Norway, dating all the way back to 1274 [5]. Since then, various acts and regulations regarding the "traffic rules" of fishing have been passed and gradually extended to cover new areas and new fisheries. The famous Lofoten cod fishery, figuring prominently in the coastal fisheries, is regulated down to detail, as to where and when to fish, and with what type of gear [18,19]. In the classic literature on fisheries economics, the process of public regulation is seen as a consequence of market failure, i.e., due to the nature of the resource, the market did not offer the right signal to the operators, thus causing overfishing and ultimately, resource extinction. In the political science and organizational literature, the transformation from market to public management is often analyzed as a change from one *steering system* to another [20,21].

In a social science perspective, regulations take place through *institutions*. Important changes, such as introducing rights-based fisheries, happen through the establishment of new institutions or modifications of old ones. Again, there is a variety of definitions, but according to Peters [22] there are at least four defining characteristics of an institution: It must be a structural feature of society, it must have existence over time, it must affect individual behavior and there should be some sense of shared values and meaning among the members of an institution. Hence, we find many institutions connected to the fisheries, both formal and informal ones. According to March and Olsen [23], public institutions should contribute to stability, routines and predictability. As pointed out by Holm [24], modern fisheries management builds on science and if we are to understand fisheries management, including the closing of the fisheries and the new distribution schemes, we must come to grips with science. Modern fisheries management is closely linked to fishery science, providing not only the data, but also the methods and the models used in management. As new problems arise and new sustainability attributes are brought to the fisheries political agenda, we engage institutions to provide solutions. Institutional inertia or outdated institutions may represent a problem, while institutional changes may represent solutions [10,25].

This brings us further to the crucial concept of *framing*, which may explain why certain solutions have been chosen while others have been neglected or refuted. According to Holm and Nielsen [26], a frame is a boundary, and framing is the process of producing this boundary. In this study, framing can be used on two levels: first, on how problems are perceived; second, on how they can be solved. Framing is central in most science and technology studies (STS), but this is not the place to explicate the various positions [27–29]. Relevant for the environmental discourse, the framing process also refers to how legitimate stakeholders (e.g., coastal- and deep-sea fishers, fisheries authorities, industry, environmental NGOs, etc.) define and perceive relevant sustainability attributes.

Finally, we must deal with *discourses*. A discourse can be defined as "how knowledge, subjects, behavior, and events are depicted and defined in statements, assumptions, concepts, themes, and shared ideas. The simplest way to think of the concept of discourse is that it provides a framework through which we see the world" [9]. While also this concept is defined and used in many different approaches [30], we prefer to keep it simple, reserving discourse as describing how various key issues in a society or in an industry are being discussed, by whom and on which arenas. In our case, we are concerned with *sustainability* and the role of the coastal fleet. Hajer [9] has demonstrated the usefulness of discussing environmental problems in the light of discourse analysis. In Hajer's discursive framework, it is a key point that the formulation and change of policy is largely about language and the creation of meaning through language. As soon as a particular view has been established regarding how a problem should be understood and how it should be regulated, policy will follow, but not without challenges. With different social and

[1] For a historic account of the individual quota regime (IVQ) for the NEA cod coastal fleet, see e.g., Standal and Hersoug [7].

economic interests involved in shifting alliances, policies will often end up as compromises, a phenomenon that is well known in fisheries policies. As demonstrated by Olsen [31], the concept of sustainability is constantly defined and redefined, according to which interests succeed in obtaining their definition as valid. The discursive framework is therefore about studying the ways in which problems are represented, how disagreements unfold, and how different social constellations or alliances around specific opinions arise. Here the media plays an important role, selecting, reinforcing or neglecting certain positions, thus contributing to what may be seen as *the established opinion*.

However, the fisheries sustainability discourse is not a static and internal matter, decoupled from the rest of society. During the last decade, several environmental attributes have been included in the fisheries sustainability discourse [32,33]. To understand the dynamics of how new sustainability attributes put pressure on existing institutions and the fisheries, it is important to clarify which actors take part in the environmental discourse, their position in society and which values and norms they represent.

2.1. Methods

This article is largely a review of former research related to how fisheries management has influenced the composition of the Norwegian fishing fleet [5,7,34,35]. We focus on governing structures and the ongoing sustainability discourse within the fisheries. As new sustainability attributes are included in the management discourse, we draw on relevant sources, such as research articles, public policy papers, fisheries statistics, and legislative publications.

The article is historically oriented, although using a sociological approach, trying to uncover how new discourses may influence the public perception of what is considered sustainable, and to what extent the coastal fisheries in particular can be considered sustainable. The discourses are selected from close reading of current public policy goals and the fisheries press covering the last ten years. We have limited the examination to the traditional coastal cod fisheries, mainly performed in the north of Norway. Other quantitative analysis, which shows the positive effects of coastal fisheries according to value adding, employment and local value chains are extensively covered by other writers ([36,3738]. However, the task of this article is to pursue *new discourses*, demonstrating how they may influence the coastal fleet and not least the relationship between the coastal and the offshore fleets. The five selected discourses are used to illustrate a trend, not to measure the exact number of statements or the participants involved. We have not considered giving a detailed account of the fleet development in terms of number of vessels, catch capacity, capacity utilization and fuel consumption. These aspects have largely been covered by e.g. [35,3940] in the Norwegian context and by Anderson et al. [41] on a more generic level.

3. The historic legacy of the coastal fleet

For more than thousand years Norwegian fisheries were dominated by the small-scale coastal fleet. When industrial steam-based purse seiners and trawlers appeared in the late 19th century, they were treated with suspicion, threatening the traditional small-scale fishers along the coast. Hence, in 1908, trawling was banned in Norwegian territorial waters (4 nautical miles at the time), and when the first Norwegian trawlers were introduced in the 1930 s, they were strictly circumscribed, limiting their numbers to 11 vessels [5].

For the next fifty years, two different production models confronted each other, the *rural* versus the *modern industrialized* [42]. In 1937, the Profitability Commission (*Lønnsomhetsutvalget*) was setting the scene by presenting a radical report, which seriously challenged the coastal fisheries. The report emphasized that focus should be on the profitability of the fisheries as input to create a modern processing industry. This would require continuous supplies of raw material, which could only be provided by industrial trawlers. The modernist perspectives of the Profitability Commission never materialized. Instead, the new Labor government (from 1935 onwards) supported the rural model, by assisting the fisher organizations to create sales unions that would stabilize prices [43].

After World War II, the Norwegian government reintroduced the modernist regime with centrally located fish processing factories, based on continuous production throughout the year. At the end of the 1950 s, the rationalization scheme was strongly reinforced by the Cod fishing Committee of 1957 (*Torskefiskutvalget*) [44]. The mandate of the committee (T 57) was to outline short- and long-term measures to improve the efficiency of the entire cod-fishing sector. A central starting point of T 57 was that the land-based freezing industry utilized only 50% of the total production capacity. Consequently, a series of proposals aimed at increasing capacity utilization in the fillet industry. Seasonal fishing with a simple and open technology, adapted to the arctic cod's migration pattern, was considered as "outdated", unable to secure maximum capacity utilization in the processing industry. Hence, the trawlers had to be brought into the industrial production chains to secure continuous supplies of fish.

However, the rural model also expanded. In the period 1948–1960, the small-scale coastal fleet less than 30 feet increased by 15,000 [45]. Despite a sharp reduction in the number of fishers in the same period, the total catch capacity increased both in the industrial and in the artisanal fleet. In the late 1960 s and the early 1970 s, there was a strong decline in most commercial fish resources. The Atlantic herring stock collapsed in 1968, due to overfishing, and the fishery was closed for the next 20 years. A similar development was seen for Northeast Atlantic (NEA) cod in the Barents Sea [1]. Resource crisis was on the agenda, and the unprofitable over-capacity became apparent. A political epoch guided by techno-economic rationality had thus ended [46,47].

Overharvested fish resources and unprofitable deep-sea fisheries lead to a revival of the coastal fisheries as the most sustainable fleet adaptation. The strong political position was also expressed by the Norwegian Fishermen's Association's policy goals, that the coastal fisheries should be the profound backbone of the Norwegian fleet, to secure sustainable fisheries, maintain local ownership and support local employment, especially in northern Norway [48,49]. The steep decline in the NEA cod stock at the end of the 1980 s ended with a crisis in 1989 and the closing of all major coastal fisheries through the introduction of the new resource allocation regime [5]. The political priority of coastal fisheries was clearly expressed by the allocation scheme for NEA cod, allocating shares of the TAC among different gear and vessel groups. It soon turned out that the competition between small and large coastal vessels was unjust, favoring the largest. This prepared the ground for a new allocation scheme, *the Finnmark model*, dividing the coastal fleet in four categories according to length, each with an allocated group quota (vessels less than 11 m, 11–15 m, 15–21 m and 21–27 m). Larger vessels were grouped as the *deep-sea fleet*. The coastal fleet was allocated the largest share of the total TAC (see Fig. 1).

However, despite the large shares allocated to the coastal fleet, no consensus or mutual understanding about the sustainability concept was reached [5,50]. The modernist protagonists used the same arguments as in the 1950 s, while champions of the rural production model saw the small-scale fisheries as the most sustainable adaptation to maintain the social fabric in rural areas. In this setting, small-scale fisheries represented a natural adaptation to the fish' migrating patterns, with low entrance costs and fuel-efficient alternatives compared to the deep-sea fisheries [51].

During the next 30 years, up to 2020, the ideological debate remained polarized, while most of the practical fisheries laws and regulations were passed by the Norwegian parliament with bipartisan support, most often based on compromise solutions worked out by the Norwegian Fishermen's Association, where both the coastal and the industrial fishers were organized [52]. In the meantime, the realities on the ground changed. The content of the key concept, "coastal fleet"

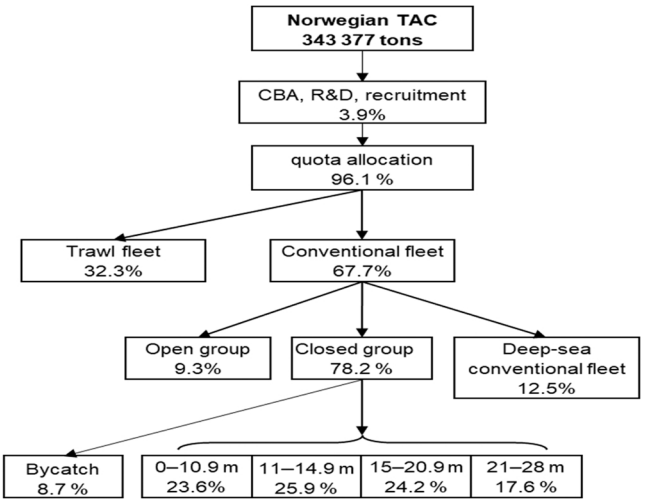

Fig. 1. The NEA cod quota allocation system, different gear- and vessel groups, 2020.[21]
Source: [54].

changed, largely due to liberalization of vessel length restrictions and the phenomenon of "capacity creep" [53].

Source: [54].

With reference to the resource allocation keys for different length groups in the closed group, a total of 1177 vessels are smaller than 11 m, 356 vessels correspond to the 11–14.9 meter group while 131 vessels refers to the 15–20.9 meter group. A total of 63 vessels are located to the largest coastal group (21–28 m). However, most of the vessels in the latter group have become deep-sea vessels, due to liberalization of vessel size restrictions (larger than 28 m). Hence, while the numbers of vessels in the latter group only corresponds to 3.6% of the total closed group fleet, they are allocated 17.6% of the total group quota of NEA cod [54]. Moreover, a total of 2400 coastal vessels conduct part-time fisheries within the open group. Hence, the traditional coastal fisheries model (described in Section 1), totally dominates within the open- and closed group, c.f. Fig. 1.

4. Questioning the sustainability of coastal fisheries

While the coastal fleet received a favourable share of the cod allocation (see Figure1), the share of the total catch declined. Nevertheless, the coastal fleet is still considered "the backbone of Norwegian fisheries". However, increasing focus on sustainability may threaten the traditional hegemonic position. In the following, we shall shortly present five different discourses, which may challenge the position of the coastal fisheries and the coastal fleet.

4.1. Coastal fisheries and Marine Stewardship Council-certification

The setting of total quotas (TACs) represents the most important element of modern fisheries management [12]. Sustainable resource management is also Marine Stewardship Council's (MSC) most central sustainability attribute in their assessment of different fisheries [55]. In 2010, the most important coastal and deep-sea NEA cod fishery applied for MSC-certification, to document biological sustainability and maintain access to the best paying international markets. The ocean-going deep-sea fisheries immediately achieved approval, due to compliance to ICES' biological reference points for both NEA cod and haddock. However, due to the bad situation for the coastal cod stock, the coastal fisheries did not achieve an immediate MSC-approval [56]. In this situation, the Norwegian Fishermen's Association managed to achieve an agreement with MSC to elaborate a management plan to restore the coastal cod stock within a five-year period [57]. With reference to the recovery plan, coastal fisheries for NEA cod and haddock, thus achieved the MSC-certification in 2011. During the agreed period (2010–2015), no significant management action for the coastal cod stock was put into action. In 2014, the same problem appeared on the agenda, and the coastal fisheries were on the brink to lose their MSC-approval. Once again, the Fishermen's Association promised to implement the coastal cod recovery plan and thus convinced MSC for a new certification for the period 2015 – 2020. However, since 2015, no significant action has been taken, and by autumn 2020, it was clear that the coastal NEA cod fisheries could lose the MSC-certification with effect from April 2021 [49]. A management plan for the coastal cod stock is still missing.

During the last ten years there has been considerable debate regarding the use of MSC-certification. The Ministry of Fisheries in cooperation with the NFA have considered an alternative certification scheme, based on many of the same criteria but under Norwegian control [57]. However, so far, the alternative never materialized, and both fishers and exporters realized that MSC-certification would be essential in many important markets, not least due to increased attention to sustainability issues among fish consumers and supermarket chains. Hence, by 2021, the most important fishery for the coastal fleet, the NEA cod fishery, has not been certified, a fact that has been widely published by many environmental NGOs. The economic effects remain to be seen, but the loss of credibility in terms of performing "sustainable fishing" is already noticeable. While traditional components of "sustainability" such as fuel consumption per kg catch and local employment still favored the coastal fleet, the certification debate is a good example of new framing of the environmental discourse. "Sustainability" was here defined as a fishery certified by MCS, where lack of certification is seen as a liability for the coastal fleet.

4.2. Ghost fishing

Gillnets are widely used in commercial fisheries throughout the North-east Atlantic Ocean (NEA), especially by the coastal fleet. In Norway, the NEA cod *(Gadus morhua)* fishery represents the most important economic single species fishery. For the coastal fleet, gillnets account for the second largest annual catch shares (35% of the total catch and 26% for the NEA cod) [58]. Coastal and inshore fisheries are especially adapted to the NEA cod's migrating pattern. During the winter season (January – April), most of the adult population of the NEA cod stock migrates to adjacent waters off the Lofoten archipelago in northern Norway for spawning. As cod is easily available in this period, gillnet fisheries are generally viewed as a low cost, catch- and fuel-efficient approach to the cod fishing [59]. In 2019, the coastal fleet comprised 5712 vessels smaller than 28 m and 96% of these were smaller than 15 m. Vessels smaller than 15 m were responsible for 89% of the gillnet landings (79,119 tons of cod with an ex-vessel value of 1.86 billion NOK [58]. The Norwegian Environment Agency suggests that more than 13,700 gillnets are lost each year,[3] while estimates from the Fisheries Directorate suggest that the numbers are closer to 1000 gillnets per year [60,61].

However, despite the popularity of gillnet fisheries, grave environmental concerns arise from the significant number of gillnets lost at sea every year. This lost, abandoned and/or discarded fishing gear (LADFG) continues catching target and non-target species, a phenomenon known as "ghost fishing", and causes negative impacts on the benthic environment. Hence, it is widely acknowledged that ghost fishing increases fishing mortality, contributes to economic losses and undermines the principles for sustainable fisheries management. The effects from lost gillnets indicate that ghost fishing may represent an annual catch of more than 20,000 tons and a potential ex-vessel value of more than 500 million NOK. Moreover, as lost nylon gillnets may be ghost-fishing for

[3] Based on interviews with coastal fishers, conducted by NTNU-Sustainability in the summer-autumn 2017 [60].

years, lost and abandoned gillnets may accumulate at sea and hence further increase the catch rates and economic losses over many years [62].

The results of this estimate report a potential accumulated number of 5000 lost gillnets over a period of ten years, and an accumulated volume of 24,288 tons of NEA cod caught by ghost fishing. This volume is equivalent to almost 3.1% of the TAC of NEA cod for 2019. Despite the uncertainties in the estimates, we observe that the accumulated number of lost gillnets, catch rates from ghost fishing and the potential ex-vessel values are substantial and highly significant. These figures illustrate that ghost fishing has a negative impact on the NEA codfish stocks and on the economic efficiency of the fishery [56]. Equally important is the fact that gillnetting, the most important fishing gear for the coastal fleet, has attracted the attention of many environmental organizations, now questioning the sustainability of this catching method, but also of the coastal fleet [57,63]. This is again an example of how an old phenomenon (loss of fishing nets) recently has been framed as a serious threat to sustainability, and the coastal fishing fleet is accused of being the main culprit.

4.3. Quota and resource control

As sustainable resource management represents the most important pillar in modern fisheries management, and higher fishing mortality than the fixed TACs, black market transactions of fish and high grading undermine the principles of sound resource management. Moreover, individual fishers who overharvest their allocated quotas make private extra benefits while the costs are shared by all fishers, due to the decline of stocks and hence, lower fish quotas for all.

During the 2013 NEA cod season, numerous rumors expressed that overharvesting fish quotas and black-market transactions in the ex-vessel sales from fishers, had become a common practice among coastal fishers [64]. With reference to the widespread rumors, the research institute NOFIMA thus conducted a questionnaire survey among fishers, to reveal their attitudes about cheating and overharvesting fish quotas [65]. The results from the survey surprised the authorities and demonstrated attitudes and practices among the fishers, which did not correspond to the goal of maintaining sustainable fisheries. The attitudes expressed by the interviewed fishers contributed to a bad reputation of the fishers in the public debate: 40% of all fishers participating in the survey answered that different forms of "cheating" is accepted and more than 60% answered that they knew other fishers were under-reporting catch to not exceed the allocated fish quotas. The findings of the NOFIMA survey were confirmed by another survey conducted by the University of Oslo and the Centre for Applied Research at NHH (Norwegian School of Economics) in 2015. Here, more than 40% of the fishers answered that high-grading and under- or misreporting of their actual catches, may be justified "occasionally" [66]. In a survey from 2019 among 668 vessel owners, skippers and crew members, 30% of the respondents answered that misreporting is not a common feature, while 63% answered that there is a 10 – 30% probability that fisher misreport their actual catch rates and 7% answered that there is more than a 50% probability for misreporting catch rates among fishers [67].

Despite the fact that the surveys strongly indicate lack of compliance and over- harvesting of allocated fish quotas, the authorities reveal only a few cases of grave law violation [58]. The present quota and resource control status has also revealed a weak and outdated control system conducted by the mandated sales organizations and the Fisheries Directorate's resource control department. This description of the situation is also confirmed by a report from the Office of the Auditor General [68]. The task of controlling the coastal cod fisheries is far from trivial. The Norwegian fishing fleet consists of more than 6000 registered vessels. Almost 5000 vessels are smaller than 11 m, while 242 vessels are larger than 28 m [40]. Hence, as most fishing vessels conduct day-fisheries spread along the long coastline and deliver the catches to a decentralized structure consisting of more than 250 land-based fish buyers, contributing to a total of more than 240,000 landings (fish transactions) per year [58]. Hence, combined with a weak- and outdated quota control, small or minor chances for getting caught, a low punishment regime and significant benefits from overfishing, the temptation to overfish the allocated quotas is considered high.

This situation prompted the fisheries authorities to establish an expert group on IUU-fishing and the elaboration of a white paper about future resource control in Norway [58].[4] Among the main findings, the white paper suggests the development of new technologies to be installed onboard all vessels for on-line detection and detailed catch and quota control while the vessels are actively fishing. As the white paper was sent out for public hearing among stakeholders, feedback from the fishers were reluctant and/or negative to new control-technologies. Instead, many fishers doubted the functionality of the technology and some replies described the suggestions as a threat to the fishers "free work at sea" [70]. The elaborate answer from NFA did not even mention that the new technology could serve as a tool to secure sustainable fisheries, by reducing overfishing, high-grading or black-market transactions of fish. While technicalities of the fisheries seldom make the big news, the message sent to the public is that cheating is a more- or less accepted practice, which again contributes to undermine the coastal fleet's strong sustainability image.

4.4. Next generation coastal fleet

The coastal vessel fleet (0 – 21 m) is the oldest part of the entire Norwegian fishing fleet, and the average age is increasing. In 2018, the average age for vessels 0 – 10.9 m was 28.3 years, 25.1 years for vessels 11 – 14.9 ms and 30.7 years for the group 15 – 20.9 ms [40]. Hence, there is a massive need and potential for fleet renewal. To maintain coastal fisheries as the most sustainable adaptation, the needs for next generation coastal vessels correspond to the development of vessels with the best seakeeping and catch efficient capacities, and on-board conservation systems to obtain the best fresh fish quality. In addition, up to date accommodation for crewmembers and safe- and attractive workplaces, are vital for the coastal fleet regarding recruitment of the next generation fishers.

During recent years, reduction of greenhouse gas emissions and a more environmentally friendly fishing fleet have become a significant topic for the entire fishing fleet. Due to national climate obligations, the Norwegian fishing fleet is obliged to a 50% reduction in greenhouse gas emissions within 2030 [71,32]. Although demersal coastal fishing vessels have a significantly lower energy consumption per kilo catch, compared to deep-sea fisheries [72], it will be vital for the coastal fleet to participate in the green transition and maintain its sustainable profile for the future. However, a survey of alternative- and more environmentally friendly fuel- and engine systems shows that such technologies are considerably more space demanding and costly, compared to traditional combustion engines [73]. Furthermore, the fishers' main goal for fleet renewal is to achieve efficiency gains, due to increased catch and processing capacity, larger cargo hull, increased technical mobility and better accommodation for the crew. Most often, in practice, this implies that existing vessels are being replaced with larger vessels, also within the coastal fleet segment [74,35].

The framework for vessel design and rules for size restrictions, are thus vital for the development of next generation coastal vessels. In this

[2] 13,433 tons (3.9%) are deducted from the total TAC and earmarked a quota bonus for catch-based aquaculture (CBA), R&D and recruitment, before sharing of the TAC among groups. Further, 15,270 tons are deducted from the closed group before sharing among the length groups [54].

[4] This has now been followed up by a new government proposal of merging control units from several agencies [69].

respect, the framework for vessel size restrictions shows radical differences for the deep-sea fleet compared to the coastal fleet. While all vessels above 21 m are only regulated by limitations for *hull volume* (measured in m^3) and no length-restrictions, the present flexible length regulations for coastal vessels up to 21 m, shall be replaced by distinct length restrictions from 2023 onwards [75]. Consequently, vessels above 21 m have no length restriction, and they are free to install the most environmental-friendly and space-demanding technologies, without compromising the catch- and processing efficiencies, and accommodation for crewmembers. However, for the coastal fleet, future needs for the next generation coastal vessels, such as more space-demanding green technologies, require a reduction in cargo hold capacity, which again limits the potential catch and processing potentials for the vessels. Due to the strict length regulations from 2023 onwards, the NFA also fears a strong increase in the number of coastal vessels described as "paragraph vessels", i.e., vessels with an extreme breadth according to length (loa), a non-optimal seakeeping design and a strong increase in fuel consumption. A critical question is thus to what extent the announced length-restrictions limit the options available for the next generation of coastal vessels [35]. This discourse is different from the previous ones, in terms of origin. While the previous discourses to a large degree have been brought into the fisheries from "outside", the issue of vessel design is more complicated. For evident reasons, the focus on reducing CO_2-emissions and other harmful climate gasses are brought into the fishing sector (as well as all other producing sectors) by the demand for a "green shift". In this case the coastal fleet has been "locked in" by an unfavorable combination of their own proposal of regulating the fleet according to length, and the fisheries authorities' practicing of this regulatory tool. The coastal fishers end up in a classical Catch22-situation: if they extend their vessels, they undermine the regulatory regime they themselves have designed, while sticking to the original length regulations they may loose the opportunities offered by new green technologies. "Damn if you do, damn if you don't".

4.5. The lock-in effects of structuration

When price subsidies were cut, from 1990 onwards, it became clear that the fishers had to manage the fleet structure themselves, i.e., they had to adjust capacity to the fish resources available. That implied structuration in the form of allowing merging of quotas, reducing the number of active fishing vessels and thus strengthen the quota-base for the remaining vessels. Structuration of the deep-sea fleet had been going on for years but started in earnest in the coastal fleet from 2004 onwards. At first, only the two largest coastal vessel groups (15–20.9 and 21–27.9 m) were allowed to merge quotas, while in 2013 also the 11–14.9 m group was also included [40]. The smallest group, vessels less than 11 m, was not allowed to merge quotas, largely because this group was considered critical for maintaining employment and supplies to the smaller processing factories in many rural communities. However, it turned out to be difficult to maintain one group outside the general pressure for increased efficiency. In 2010, a new system was introduced allowing two (or more) vessels to cooperate in the actual fisheries, fishing two vessel quotas with one vessel, if both vessels were certified as seaworthy. The argument was that fishing alone was dangerous. Hence, having two fishers onboard would reduce the risk of casualties and mortal accidents. In practice, the fishers soon found a new loophole, as they got acceptance for a system whereby a fisher could "cooperate with himself', i.e., the fisher could have two (or more) vessels, while using only one of them in the actual fisheries. As per the end of 2020, 287 cooperative arrangements were registered, of which 2/3 were fishers operating several vessels alone. In practical terms, this was a form of hidden structuration, whereby large numbers of small-scale vessels were actually not fishing, while still figuring as belonging to the important small-scale fleet less than 11 m. When the entire management system was evaluated by the Auditor General [40], this arrangement received harsh criticism. Consequently, in 2021 the Norwegian parliament decided that the scheme should be terminated by the end of 2025.

In the period 2010–2020 there was unilateral political support for keeping the smallest fleet segment out of the structuration scheme, due to the importance of this fleet in terms of maintaining the social fabric of the small coastal communities and not least, its importance for recruitment of new fishers. However, among the actual fishers, the attitude was more divided. Many saw structuration as the only solution to survive, but they kept quiet as long as they were allowed to buy more vessels and operate as "cooperating with themselves". When this opportunity was closed, the debate started immediately, with small-scale fishers now claiming to be included in the structuration schemes. Even the Norwegian Fishermen's Association claimed that a careful structuration should be considered, allowing two quotas to be merged on one vessel [76]. The new debate puts pressure on the smallest group, threatening to reduce their numbers in the years to come. On the other hand, if no structuration is allowed, there is a real danger of a *lock-in effect*, whereby fishers in this group will not be able to follow the general trend of merging quotas, which is now established practice in all the other vessel segments in the coastal fisheries. This would over time, weaken their economic position and probably also reduce the attractiveness as a recruitment channel.

Even within the smallest group, there is a development that so far has attracted little interest. When length is restricted, it is possible to increase both with and height and hence cargo volume. A coastal vessel from 1971 has little resemblance with a coastal vessel built in 2018 (see Fig. 2). Small may not (any longer) be perceived as "beautiful", but more important, this development may question the whole notion of what should be included in "the coastal fleet".

The coastal fleet group is thus regulated in a totally different manner. While capacity adaptations to increase economic efficiency for all vessels above 11 m are guided by market-based transactions of vessels and quotas, vessels below 11 m have no access to such transactions. Instead, a scrapping scheme, financed by the fishers, is suggested to reduce surplus capacity from 2025 onwards [75].

5. Discussion: turning the tables?

The coastal fisheries concept is traditionally defined as *the most sustainable fisheries adaptation,* due to low capital and entrance costs, fishing with conventional (passive) gears, contribution to employment systems in rural areas and energy-friendly adaptations according to fish migration patterns. Hence, the historical sustainability discourse was mainly directed towards the deep-sea fisheries with critical attention to the use of energy, high investments, centralization of fleet and processing facilities, etc. Until recently, the coastal fisheries have received less critical attention. The new discourses present the coastal fishers with new challenges, which may threaten their traditional role as the most sustainable fisheries. For the coastal fleet the focus on ghost fishing

Fig. 2. Two fishing vessels in the same category, 10.98 m and 10.5 m, built in 2018 and 1971.
Source: [77].

from lost or abandoned gillnets fisheries has not triggered any significant changes in the conduct of the traditional fisheries. Instead, loss of gillnets is traditionally perceived as a natural part of the traditional fishery. This also applies to the overharvested coastal cod stock, as no radical measures have been implemented to rebuild the coastal cod stock. The loss of MSC-certification for the coastal vessels fishing inside 12 nautical miles thus represents a novel and paradoxical break with the traditional sustainability perceptions regarding the cod fisheries.

Traditional coastal fisheries are now challenged by new environmental imperatives, which were previously not part of the original coastal fisheries sustainability concept. This development also indicates that transnational policy goals, outside the traditional fisheries domain (e.g., global climate initiatives), impact the national fisheries policy. In this respect, it is interesting to note that the private, international organization MSC defines the coastal cod fisheries as unsustainable [57]. The fact that the Ministry of Fisheries is in charge of fisheries management and claim to be a "world champion", is no longer sufficient. Consumers as well as restaurants/hotels, catering and food chains believe in certification schemes, which in this case have been denied for coastal NEA cod as well as for many pelagic fisheries. For a country exporting more than 90% of the total catches, the perception among consumers of what is *sustainable* is no marginal concern.

The fourth discourse, reducing emissions and in particular CO_2, has been brought to the fisheries from outside. Both the offshore- and the coastal fleet has been quick to respond. In this setting, the coastal fleet is maneuvered into a corner by the Parliament, as length limitations will be an important impediment for introducing new, space-demanding green technologies. The fifth discourse, regarding the smallest group of coastal vessels (the largest in terms of numbers) has for years been dormant, enjoying bipartisan support. However, when the option of fishing several quotas on one vessel was terminated, this produced a split among the small-scale fishers; those who preferred to stay outside the structuration scheme, and those who would be included. Local politicians as well as environmental NGOs have supported the former position, fearing a dramatic reduction in numbers if structuration is allowed.

In summary, the traditional concepts of sustainability have been challenged by new developments and a new agenda, often orchestrated by new actors, such as the environmental NGOs, which formerly played a marginal role in fisheries management. Fisheries is no longer "a closed shop", run by the Ministry, the Directorate, the interest organizations and the sales unions. The framing of fisheries management and what is considered *sustainable* has changed. This is bound to affect the fishers and the fleet, but contrary to former debates, now the coastal fleet is also on the line.

How this is going to affect the institutional set up, remains to be seen. Two trends are clearly visible by the early 2020 s. The first refers to the organization of the fishers, now constituting only 10,000 (including the coastal as well as the offshore fleet). While Norwegian fishers for years belonged to the same organization (the NFA), they are now scattered in several splinter organization, according to size, fishing gear and ethnicity, although NFA is still by far the largest and most important. However, even here, the fishers in the north have now created their own splinter organization, threatening to leave the NFA, largely due to different opinions regarding resource distribution.

The second refers to the management structure. When the Ministry of Fisheries was merged with the Ministry of Trade in 2014, it was a clear sign of reduced importance. Fisheries and even the rapidly expanding aquaculture sector did not deserve its own ministry, which had existed right since 1946. Where fishing and sea transport had dominated the sea areas for years, they were increasingly surrounded by a host of other interests, such as petroleum extraction, salmon farming, tourist interests, recreational users, the Navy and more recently, expansive plans for offshore windmills and mineral extraction from the sea bottom. In this situation, many stakeholders have claimed that a "super ministry" should be ultimately responsible for all activities at sea. However, there is no agreement as to which ministry should take this role, not even within the fishing industry. Oil and gas interests are well served by the Ministry of Oil and Energy, others point to extended responsibilities for the existing Ministry of Trade, Industry and Fisheries, while conservation interests would like the Ministry of Environment and Climate to be the new super department [78]. What is evidently clear is that the coastal fishers will have to fight for their existence, not only within the fisheries sector but also in competition with an increasing number of other interests [15].

6. Conclusions

As pointed out in the introduction, coastal fishers and the coastal fleet traditionally have a strong standing in Norwegian fisheries. When the modernist fisheries regime, based on trawlers and continuous supplies of raw material first was introduced in the 1930 s, the idea folded immediately. After the Second World War, the modernist approach had more success, with the large-scale introduction of trawlers and purse seiners, serving the new processing factories. The resource crisis in the late 1960 s/early 1970 s brought back the rural production model and increased legitimacy for the small-scale coastal fisheries. However, the new management revolution following the establishment of national EEZs, changed the picture, to the extent that Holm [24] has characterized the process as "the silent revolution". Shortly summarized, while the fishers previously had to be protected from greedy fish buyers, the primary goal now is to protect the fish from the fisher!.

Establishment of TACs for all important fish stocks, and individual vessel quotas were means to secure *biological sustainability*. In the 1990 s, *economic sustainability* was achieved through stable resource allocation keys and structuration of the fleet, allowing transferable quotas for most of the fleet groups. The entering into the European Economic Space agreement in 1990 abolished direct state support through the Main Agreement. *Social sustainability*, which had figured prominently in all former fisheries policy, was now largely abandoned. The fishers and the fisheries authorities no longer had an explicit responsibility for maintaining the social fabric in the coastal communities. Instead, the structural policies, via market-based transactions of quotas and vessels, were supposed to solve all efficiency problems within the fleet. Commitment to the coastal fleet and the coastal fishers still figured strongly, while the realities on the ground rapidly changed. While the two smallest coastal vessel categories (less than 11 m and 11–15 m) each had ca. 10% of ex vessel value for all species, the larger coastal group (15–21 m) reduced its share from 20% to 10%, while the largest group (21–28 m) was substituted by the new category "large coastal vessels" which expanded rapidly after the length limitation was lifted in 2008. Hence, by 2020, the deep-sea fleet, (now comprising also the "large coastal vessels") increased its share from 60% to 70% of the total ex vessel value [16].

These figures were not the result of a political conspiracy. Quite the contrary, since the closing of the fisheries in the early 1990 s, NFA had been the chief architect of the distributions keys as well as the structuration schemes. In the process, many fishers were interested in increasing the size of their vessels. With the introduction of what was called "large coastal vessels", from 2004 onwards, several coastal vessels have become deep-sea vessels in terms of vessel size. Followed by the market orientation of the quota regime and liberalization of vessel size restrictions, smaller vessels were replaced by larger vessels. In this manner, quotas were reallocated from smaller to larger coastal vessels. In the fixed length groups, we saw new vessel designs, characteristically called *paragraph vessels*, i.e., they were wide and high but within the crucial length restrictions (10.99 m and 14.99 m). Despite the introduction of tradeable quotas, the famous concept from fisheries economics of *capacity creep* had definitely entered not only the industrial fleet, but the coastal fleet as well. While the number of vessels in all categories had been reduced, due to various structuration schemes (except for the smallest group), catch capacity of each individual vessel had increased [40].

In this situation new environmental discourses, all connected to sustainability, turn out to challenge the hegemonic status of the coastal fleet. Hence, to maintain the strong sustainability status of the coastal fleet, it is vital to cope with the new challenges. First, in order to regain the MSC certification for the coastal fleet, the management authorities must elaborate a credible management plan for the rebuilding of the coastal cod stocks. As long as MSC certifies fisheries outside 12 nautical miles as sustainable, this may contribute to a pressure towards a larger and more mobile fleet. Second, to avoid ghost fishing, adaptations to alternative fishing gears, such as long line and Danish seine, may be relevant options. However, increased use of Danish seine may contribute to more plastic pollution from fishing vessels, as the use of large ropes from Danish seine represents a major source for plastic litter to the sea. This approach may also contribute to the building of larger vessels to handle alternative gear adaptations in a rational and safe manner. Alternatively, the authorities should stimulate for the use of biodegradable gillnets, via taxation of today's use of nylon gillnets, possibly combined with a quota bonus to increase the use of such gillnets. This strategy may potentially reduce ghost fishing. Third, a better resource management via a more effective quota- and catch control may represent a collective good for all fishers. However, the NFA is negative to the implementations of such control technologies onboard the vessels, as they claim that only a few fishers overfish their quotas. Hence, on behalf of the vast majority of fishers, the NFA should be more proactive to resource control technologies, as this approach may benefit all fishers and prove their compliance to the quota regime. Fourth, despite coastal vessels are significantly more fuel-efficient than deep-sea vessels [39], it is still important to implement new green technologies to maintain- and strengthen the sustainability profile. However, to optimize the transition to green technologies requires more space onboard, again increasing the vessel size. Finally, the well-intentioned decision to exclude the smallest vessels from structuration may in the longer term, leave this fleet as less attractive in economic terms due to the "lock-in effect", and thus hamper their future ability for fleet renewal. As demonstrated, there are remedies and strategies to meet the new challenges, but most of them involve dilemmas, for which there are no "quick fix" solutions.

Altogether, the new sustainability attributes may challenge the present fleet structure and resource allocation keys among the different vessel groups in the coastal fleet. While the "Finnmark model" (operating with four different size categories, each with a fixed percentage of TAC) was reasonably successful for many years, there has been a permanent pressure in the direction of increased vessel efficiency and size [16]. When *actual* vessel length now seems to be the main parameter for future regulations and resource allocation [75], it is reason to believe that the pressure for exceptions and reordering will continue. An alternative would be to regulate the coastal fleet (under 21 m) by cargo capacity, to allow adaptations that are more flexible, as suggested by Standal and Aasjord [35]. This would put these coastal fleet groups on an equal footing with the vessels above 21 m and the deep-sea fleet, all of which are regulated by cargo size. The most pressing issue, however, would be to start the discussion of what should be included in the concept of the "coastal fleet". Should it be based on length (the "Finnmark model"),[5] on cargo volume, on type of fishing gear or on area of fishing? By 2021, it is obvious that the old definition of "coastal fisheries" does not cover the realities on the ground. The new group, *large coastal vessels*, are in reality deep-sea vessels, some of them even larger than the smallest trawlers in the deep-sea fleet. Hence, the traditional coastal fishers face a double challenge; first from external sustainability concerns, largely raised by environmental global policy trends and NGOs, gradually with considerable political support. Second, by the fisheries administration, which regulates the fleet and the resource allocation to the disfavor of the traditional coastal fishers. Consequently, the future of the coastal fisheries and the coastal fishers will be determined not only by which new discourses that are included in the concept of sustainability, but also who and what type of vessels are included in the important, crucial term "coastal". The debate is nowhere near a conclusion.

[5] For a description of the Finnmark-model, dividing coastal vessels into four different length groups, see e.g., Standal [69].

CRediT authorship Contribution statement

Dag Standal: Conceptualization, Methodology, Investigation, Writing – original draft preparation, Writing – review & editing. **Bjørn Hersoug:** Conceptualization, Methodology, Investigation, Writing – original draft preparation, Writing – review & editing.

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