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Food security and safety in fisheries governance – A case study on Baltic herring

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ABSTRACT

One of the objectives of the EU Common Fisheries Policy (CFP) is to increase the contribution of fisheries to fish food availability and self-sufficiency. Still, the use of catch is often a secondary concern in fisheries governance and management – or not a concern at all – while the focus is on harvesting. This paper examines how the use of forage fish for human consumption can be increased within the limits of sustainability, using Baltic herring as a case study. Baltic herring contains high levels of dioxins and the human consumption is very low: the catches are mostly used for industrial purposes. The paper uses a participatory backcasting exercise to define a desirable future vision for the use of Baltic herring catch and to develop pathways of actor-specific governance actions to increase the use of the fish as a safe-to-eat food. The results reveal that increasing the contribution of forage fish, such as Baltic herring, to food security entails a paradigm shift in fisheries governance that involves 1) inclusion of well-defined objectives for catch use in the EU CFP and the related regional multiannual plans, 2) broadening the scope of the MSY-driven governance and management to one that addresses catch use, and 3) proactive catch use governance.

1. Introduction

The recently reformed EU Common Fisheries Policy (CFP) calls for increased contribution to food security while "paying full regard" to food and feed safety to decrease the dependence of the EU fish and seafood market on imported products [14]. The growing demand for fish in the EU [19] has been met mainly by importing fish from non-EU countries, including developing countries, and increasing aquaculture production [17,44,65]. These are of concern, because the former may weaken food security in the poorer regions of the world [2], and the latter has adverse effects on the marine environment [27,61]. In addition, many fisheries around the world have been exploited at intensities that have driven fish stocks far below the maximum sustainable yield (MSY) levels [3]. At the same time, small pelagic species, the largest group in capture fisheries, have been used primarily for industrial purposes [20,62], despite the repeated call by the UN to prioritize the resource for human consumption [21,24,25].

The reformed EU CFP raises food security as a new issue to address and to aim at in fisheries governance. However, it identifies aquaculture as the only strategy to increase food security, while the contribution potential of small pelagic forage fish that have been underutilised from the perspective of food security is not mentioned. Instead, the European Parliament and Council have emphasized that "all fishery products landed, including those that do not comply with common marketing standards, may be used for purposes other than direct human consumption" [15]. This indicates that currently there is no interest to govern the use of the catch at the EU level and that the trend of reducing wild captured fish into feed is likely to continue unless the issue is more explicitly addressed.

At least two explanations can be identified for the apparent limited interest in governing the use of the catch. First, fisheries governance has evolved from the need to control the use of common-pool resources in an ecologically sustainable manner [28,41,43]. The MSY principle, which aims to restore and maintain fish abundance above the levels that can produce the largest yield [14], has been the main tool to govern harvesting [18,39]. Owing to the over-riding aim of fisheries governance to maximise the harvest in an ecologically sustainable way (see e.g. UN Law of the Sea, EU CFP, UN Sustainable Development

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Goals) and the narrow definition behind the MSY principle, many other issues and objectives, such as food security, are not explicitly addressed by the fisheries governance [52]. Second, commercial fishing has been treated as business activity that is largely driven by economic objectives [56] and therefore fisheries governance has tended to rely on market-based mechanisms and self-organising fishers to maximise economic growth [6]. Although the use of the catch can be affected by governance mechanisms that are imposed on the fisheries sector, such as food safety requirements, trade policies [64], and sustainability certifications [47], catch use is ultimately determined by market conditions, i.e. demand, costs and revenue [56], which Stephenson et al. [59] have considered largely uncontrollable by fisheries governance and management.

The aim of this paper is to examine how food security and safety issues could be integrated in fisheries governance. The paper defines food security as "physical availability of food, economic and physical access to food, food utilisation, and stability of the three dimensions over time" [23]. Food safety refers to the quality of the product, namely that the fish is safe to eat [16,25]. The paper uses the governance of Baltic herring (*Clupea harengus*) fisheries as a case study to explore how the contribution of forage fish to food security could be increased. Baltic herring has been regarded as an abundant and sustainable resource [33,34], but as the majority of the catch is used for industrial purposes, the species has a great contribution potential to food security. After the collapse of the Baltic cod stock in the late 1980s, Baltic herring and sprat have been the main commercial catch species in terms of volume in the Baltic Sea [73]. However, the relative importance of Baltic herring varies between the nine Baltic Sea riparian countries: while all nine countries have a herring fishery, the largest annual herring quotas have been allocated to Finland and Sweden, circa 40% and 20% respectively [33,34].

The paper is structured as follows. First, a background of the use of Baltic herring catch and food security and safety in fisheries governance is provided. The methods section describes a participatory backcasting method that was applied to define a desirable future state for the use of Baltic herring catch and to create pathways of actor-specific governance actions towards concrete acknowledgement of food security and safety in fisheries governance [54]. This is followed by a discussion on how to increase the contribution of Baltic herring to food security within the limits of sustainability from the perspectives of the abovementioned obstacles for catch use governance, namely the aquaculture-driven food security policy, the MSY-driven fisheries governance and management, and the market-driven catch use governance.

2. Background

2.1. The use of the catch

Baltic herring has been a traditional source of food in many Baltic Sea countries, but over the past few decades the demand for it as food has decreased to an all-time low [26,42] and instead, the majority of the catch has been fed to fur animals or reduced to fishmeal and oil [33,38]. In Finland, for example, around two thirds of the catch have been used to feed fur animals since the 1980s [57,58]. One plausible explanation for the decreased demand for Baltic herring as food is related to the simultaneously increased demand for and supply of farmed salmon and rainbow trout, and canned tuna [26,40,42]. In addition, Baltic herring is consumed mainly by elderly people [26,40], which implies that in the future the demand is likely to decrease further unless the demand for herring products amongst younger people begins to increase. The use of the catch is also affected by the conventional and largely-accepted focus of the Baltic herring fleets on targeting herring primarily for industrial purposes [38]. This decreases the availability of Baltic herring suitable for human consumption.

From the food safety perspective, the potential to use Baltic herring for human consumption is restricted due to high concentration levels of dioxins, which often exceed the maximum allowable level established by the European Commission for food and feed [10]. Dioxins are persistent organic pollutants (POPs) that accumulate in the fatty tissue of herring and are known to have adverse impacts on ecosystems and human health [1,30]. The dioxin concentrations have been decreasing from their peak in the 1970s, but the problem still remains in many parts of the sea [71]. Currently, herring from the southern and western parts of the Baltic Sea is considered to be compliant with the regulation, while large herring[1] from the northern and eastern parts, is likely to exceed the maximum allowable dioxin level [9].

As a result of the dioxin regulation [10], the EU Member States are not allowed to place fish that exceeds the maximum allowable level of dioxins on the EU food market. However, Finland, Sweden, and most recently Latvia, have been granted an exemption to place such fish on their national markets, providing that they inform consumers of the related health risks [13]. The main arguments behind the exemption request in Finland and Sweden include cultural importance of Baltic herring, health benefits related to fish consumption and the need to protect fishermen's livelihoods [1]. The exemption is particularly crucial from the Finnish perspective, because the nation's most important commercial fishery operates mainly in the Gulf of Bothnia [46], where the dioxin concentrations are the highest, but also since the traditional Finnish herring dishes are made exclusively of large herring.

The other Baltic Sea countries, which could also apply for the exemption, but have chosen not to, have implemented alternative strategies. For example, in Estonia, where the majority of the catch is used for direct human consumption, the strategy is to target small, safe-to-eat Baltic herring to gain access to the EU market [7]. Whereas in Denmark, the majority of the Baltic herring catch is used for industrial purposes [8]. Russia, the only non-EU member state in the Baltic Sea region and therefore the only country unaffected by the dioxin regulation, has been a significant buyer of Baltic herring intended for direct human consumption. In mid-2014, the exports to Russia came to halt as a result of the sanctions between the EU and Russia related to the crisis in Ukraine. This share of the catch has been since used mainly for industrial purposes [46]. The fish fed to fur animals is not limited by the regulation, but the feed used in aquaculture is. However, over the past decade the removal of dioxins from the fishmeal and oil during the production process has become cost-efficient, and therefore, the use of Baltic herring as feed in aquaculture has been increasing [58].

2.2. Food security and safety in fisheries governance

Baltic herring fisheries are governed in a multi-level setting. Within the formal governance system, decisions on fisheries management and regulations are made at the EU level and their implementation is carried out at the national level. In addition, there are two regional bodies: the Baltic Sea Fisheries Forum (BALTFISH), which is a platform for cooperation between the EU Member States in the Baltic Sea region on fisheries management, and the Baltic Sea Advisory Council (BSAC), which is a stakeholder forum.

The management of Baltic herring fisheries is realised via the EU CFP and the related multiannual plan for the stocks of Baltic cod, herring and sprat [13]. These policies do not address the use of the herring catch explicitly. This has not always been the case: between 1977 and 1998, the direct fishing and landing of herring for purposes other than human consumption was prohibited in the EU on the basis of overexploitation and declining herring stocks [11,12]. Thus, if there is political will, the EU enforcement power could be harnessed also to enhance the contribution of Baltic herring to food security.

In the absence of formal top-down arrangements, bottom-up initiatives have emerged to enhance the use of fish as food in a sustainable way. The Marine Stewardship Council (MSC) is an international

[1] For ICES subdivision 28.1 the limit for large herring is 21 cm, for other subdivisions it is 17 cm.