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Evaluating fisheries systems: A comprehensive analytical framework and its application to the EU's Common Fisheries Policy

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Abstract

Despite regular reforms, problems under the EU's Common Fisheries Policy (CFP) persist. In order to identify priorities for future reforms of the policy, we developed an analytical framework consisting of 17 criteria and specifying indicators, derived from scientific, wider fisheries, and common resources literature. We applied the framework to the CFP governance system, its regulations, institutions, and processes at EU as well as member state level. The results show that the CFP does not fully meet any of the 17 criteria for an effective resource policy. Its performance was assessed as "neutral" regarding 10 criteria and "negative" regarding seven criteria. Trend analysis shows that there is a slightly positive trend regarding the CFP's performance, with five criteria trending positively, 11 showing a neutral trend and only one criterion trending negatively (simplicity of rules). The analysis identified five criteria which are performing badly and have not improved over time: simplicity of rules, user-pays principle, resource efficiency, accountability, and compliance mechanisms. Future reforms of the CFP should first and foremost address these criteria while continuing efforts to improve the CFP's performance regarding other criteria. The evaluation of the CFP demonstrates the applicability of the analytical framework which can also be applied to other multilevel fisheries governance systems. Moreover, the results can inform reforms of Regional Fisheries Management Organisations. Like the CFP, these institutions manage transboundary fisheries and have not effectively addressed the issues of resource rent capture and resource efficiency.

KEYWORDS

CFP reform, fisheries governance, indicators, institutional design, multilevel governance, resource management

1 | INTRODUCTION

Since its inception in 1983, the European Union's (EU) Common Fisheries Policy (CFP) has undergone a series of reforms (Council of the European Communities, 1992; Council of the European Union, 2002; European Parliament & European Council, 2013). Its latest reform brought about most importantly the landing obligation, increased regionalization, and the objective of achieving Maximum Sustainable Yield by 2020 "at the latest" (Art. 2(2) of the Basic Regulation, European Parliament & European Council, 2013) (Peñas Lado, 2016). Despite these reforms, problems persist under the CFP such as the implementation of the landing

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obligation, slow progress towards the Maximum Sustainable Yield objective (STECF, 2017a), the low profitability of the small-scale fleet (STECF, 2017b), and a lack of knowledge regarding some commercial stocks (STECF, 2017a). Further changes to the CFP will likely be necessary to address these problems and a review of the CFP is foreseen under EU law in 2022 (Art. 49 of the Basic Regulation, European Parliament & European Council, 2013). In order to address the problems of the CFP, it is first necessary to comprehensively evaluate the policy to identify the most pressing issues for reform. The aim of this paper is to provide such an evaluation. The scope of the evaluation is not limited to the EU level but also comprises the member states' fisheries policies which implement EU legislation and it comprises non-EU institutions involved in EU fisheries management such as the International Council for the Exploration of the Sea. The analysis includes not only fisheries regulations ("policy") but also the relevant institutions ("polity"), and decision-making processes ("politics"). We thus apply a wide definition of "the CFP" that looks beyond the EU level and beyond the Basic Regulation as the key legislative act of the CFP.

There are a number of analyses of the CFP's performance. Most prominently, there were several reviews of the CFP before the 2013 reform (EC, 2009a; Markus, 2009; Sissenwine & Symes, 2007; SRU, 2011; WWF, 2007). There are also regular publications by the EU on specific aspects of the CFP's performance such as the monitoring report prepared by the Scientific, Technical and Economic Committee for Fisheries (STECF) (STECF, 2017a with a focus on the CFP's ecological dimension), the STECF Annual Economic Report on the EU Fishing Fleet (STECF, 2017b with a focus on the CFP's economic dimension), the European Commission's (EC) annual policy statement (EC, 2017a with a focus on the CFP's ecological dimension but also covering economic and governance issues). The Organisation for Economic Co-operation and Development (OECD) also provides regular statistical and analytical reports with a focus on the national level which cover most EU member states with regard to their fishing industries and fisheries policies (OECD, 2016, 2017). There are a number of academic contributions that address the performance of the CFP (e.g., Carpenter, Kleinjans, Villasante, & O'Leary, 2016 on quota setting; Griffin, 2013 on good governance; Ramírez-Monsalve et al., 2016 on multi-annual multispecies management plans; Salomon, Markus, & Dross, 2014 on the potential of the 2013 Basic Regulation to address the problems of the EU fisheries governance system). What is missing from the literature is, however, a comprehensive evaluation of the CFP after the 2013 reform which covers not only the EU level but also aspects of the member states' policies. Furthermore, progress can be made in the CFP evaluation practice by formulating and applying indicators and thresholds in order to make the evaluation more transparent, especially with respect to social, governance and knowledge criteria.

A systematic evaluation of the CFP first requires an analytical framework containing the relevant criteria against which the policy can be evaluated and indicators which make these criteria measurable. The academic and public institutions literature contains several articles which discuss criteria for evaluating fisheries policy. These contributions however do not address the issue of multilevel governance which is a central feature of the CFP but focus on specific levels of fisheries systems (e.g., Charles, 2001 suggesting a comprehensive framework with emphasis on the local level; FAO, 2015 whose Kobe criteria apply to Regional Fisheries Management Organisations which are situated at the international level; Grafton, Kompas, McLoughlin, & Rayns, 2007 who analyse the national level using the example of Australia). Further authors are not comprehensive in their analyses, that is they do not capture a fisheries governance system along the range of relevant dimensions but focus on selected aspects (e.g., Bromley, 2009 examining primarily economic aspects; FAO, 2012 focussing on recreational fisheries). Other suggested frameworks address aquatic resources but not

marine fisheries specifically (Castillo, Baigún, & Minotti, 2016 on river systems). In order to evaluate the CFP and identify priorities for reform, we therefore first constructed an analytical framework synthesizing the existing contributions. This framework contains 17 criteria and can be applied to evaluate other multilevel fisheries governance systems worldwide (e.g., Regional Fisheries Management Organisations, fisheries governance systems in federal states). The analytical framework expands previous frameworks by providing a more holistic and transparent approach to evaluate fisheries at a systemic level.

The structure of the article is as follows: In Section 2, we describe how we derived our analytical framework and which data and information we used to evaluate the CFP as our case study. Section 3 presents the findings of applying the framework to the CFP. In Section 4, we explore the implications of the analysis for fisheries governance under the CFP and beyond and the applicability of the framework to other contexts. Following the concluding section, the Supporting Information contains an overview table which provides additional detail regarding the evaluation of the individual criteria.

2 | METHODS AND APPROACH FOR DEVELOPING AND APPLYING THE ANALYTICAL FRAMEWORK

2.1 | Identifying a set of criteria

To identify criteria for effective fisheries management, we conducted an extensive literature analysis of academic publications (e.g., Bromley, 2009; Castillo et al., 2016; Grafton et al., 2007; Griffin, 2013), publications of public institutions (e.g., EC, 2001; FAO, 2015; WBGU, 2013), and legal texts (e.g., European Parliament & European Council, 2013). The 17 criteria we derived were repeatedly stated in the resource policy and fisheries management literature and can therefore be considered key criteria for an effective fisheries policy. We preferred this approach over a more systematic search for criteria and dimensions because the public institutions literature (such as De Young, Charles, & Hjort, 2008) was found to considerably complement the existing academic references on the governance of fisheries systems. To structure the set of criteria, we assigned the individual criteria to five dimensions—ecological, economic, social, good governance and evidence—as shown in Table 1. The ecological, economic and social dimensions mostly relate to outputs of fisheries policies (Scharpf, 1997); the good governance and evidence dimensions mostly relate to throughputs as governance processes.

Although our set of criteria together with the five dimensions is based on an extensive review of the relevant literature it remains by definition normative. Several sets of criteria for fisheries management systems exist, and there is no objective way of reconciling the differences between them (Bromley, 2009; Castillo et al., 2016; Grafton et al., 2007). The selection and prioritization of adequate criteria for fisheries management is ultimately a political task, not an academic one. Accordingly, the criteria were conceived as equally relevant by the authors. Nonetheless, the evaluation of the criteria in this article can serve as a basis to identify areas for improvement of the Common Fisheries Policy (CFP) and other fisheries systems to the extent that policymakers and society agree with the underlying principles. In the context of the CFP, the ultimate decision on the objectives and measures of fisheries policy is made in a highly politicized multilevel system in which diverse actors compete for influence. Similarly, the *implementation* of objectives is affected by political factors as the controversy regarding the setting of Total Allowable Catches under the CFP shows (Carpenter et al., 2016). While science can thus inform fisheries policy by providing verifiable information, the actual process of adopting fisheries policy is driven by the subjective perceptions and differing interests of the involved actors.

2.2 | Operationalizing the 17 criteria

To operationalize the set of 17 criteria, they were divided into 37 subcriteria specified by 45 indicators and thresholds (see the Supporting Information for a complete list of subcriteria, indicators, and thresholds). The indicators were selected according to properties of effective and workable indicators, including sound "theoretical basis" (consistent with 17 criteria derived from literature), "policy-relevance" (covering key issues representing the wider fisheries governance system, reflecting changes over time) and based on available data (quantitative, if possible; otherwise qualitative) (see Le Gallic, 2002; Rice & Rochet, 2005).

To evaluate the status quo of the indicators, we defined thresholds. Where possible, we derived the indicator thresholds from international treaties (e.g., the 10% threshold of marine protected areas under the "coherence" criterion is a target under the Convention on Biological Diversity (CBD, 2018)); from the CFP or wider EU legislation (e.g., the threshold of achieving Maximum Sustainable Yield by 2020 under the "ecological sustainability" criterion is an objective in the Basic Regulation), or from practices in other fisheries systems (e.g., the 30% cost recovery by industry threshold under the "user-pays" criterion was derived from the level of cost recovery in fisheries systems addressed in Marchal et al. (2016)). Where no thresholds could be derived, they were established by the team of authors, mostly in binary terms, and in combination with scientific literature (e.g., the threshold "acknowledgement of recreational fishing" under the "distributional aspects—cross-sectoral" criterion). Based on the thresholds, the performance of the CFP regarding each indicator was evaluated as positive, neutral or negative.

In addition to the status quo, we evaluated the trend of the indicators. No standardized methodology could be used due to differences in data availability and in the types of data (qualitative or quantitative). Where possible, we tested whether an indicator showed a statistically significant time trend. Where no quantitative data were available or the length of the time series was

TABLE 1 Analytical framework for evaluating fisheries systems, divided into five dimensions, 17 evaluation criteria, and their origin [Colour figure can be viewed at wileyonlinelibrary.com]

Dimension	Criterion	Origin
Ecological The ecological dimension refers to the exploitation of fish stocks and interaction of fishing activities with marine ecosystems	Ecological sustainability (Eco1)	Academic literature (e.g., Goodland, 1995) International Law (United Nations Convention on the Law of the Sea (UNCLOS), United Nations Fish Stocks Agreement (UNFSA)) CFP Basic Regulation (Regulation (EU) No 1380/2013 of the European Parliament and of the Council) (Art. 2.1)
	Ecosystem approach (Eco2)	Academic literature (e.g., Jennings & Rice, 2011; Ramírez-Monsalve et al., 2016) International Law (UNCLOS, UNFSA) CFP Basic Regulation (Art. 2.3)
Economic The economic dimension refers to the effectiveness of a fisheries governance system in promoting the short- and long-term maintenance of production factors and in generating economic benefits both for the fishing sector and for society at large	Economic viability (Ec1)	Academic literature (e.g., Blazejczak & Edler, 2004; Cochrane, 2000) CFP Basic Regulation (Art. 2.1, 2.5(c))
	Long-term thinking—planning security (Ec2)	Academic literature (e.g., Blazejczak & Edler, 2004; De Young et al., 2008) CFP Basic Regulation (Art. 3d)
	User-pays principle (variation of the polluter-pays principle) (Ec3)	Academic literature (e.g., Bromley, 2009, p. 288) Public institution (OECD, 1995) Treaty on the Functioning of the European Union (Art. 191(2))
	Resource efficiency (Ec4)	Public institution (EEA, 2015a) Europe 2020 strategy (EC, 2010) CFP Basic Regulation (partly through Art. 2.5a)
Social The social dimension captures distributional aspects, that is most importantly the adequacy of mechanisms which allocate access to marine and further relevant resources	Distributional aspects—Intragenerational (So1.1)	Academic literature (e.g., Garcia, Zerbi, Aliaume, Do Chi, & Lasserre, 2003) Public institution (OECD, 1995) CFP Basic Regulation (partly through Art. 2.5(f))
	Distributional aspects—Cross-sectoral (So1.2)	Academic literature (e.g., Agrawal, 2002; Garcia et al., 2003) Public institution (e.g., De Young et al., 2008; OECD, 1995)
Good governance The good governance dimension refers to criteria for legitimate and effective decision-making processes and outcomes	Participation (Gov1)	Academic literature (Griffin, 2013) Commission White Paper on European Governance (EC, 2001) CFP Basic Regulation (Art. 3f)
	Transparency (Gov2)	Commission White Paper on European Governance (EC, 2001) ("Openness") International Law (UNFSA) CFP Basic Regulation (Art. 3k)
	Accountability (Gov3)	Academic literature (e.g., Grafton et al., 2007) Commission White Paper on European Governance (EC, 2001)
	Coherence (Gov4)	Commission White Paper on European Governance (EC, 2001) CFP Basic Regulation (Art. 3h/j)
	Decentralization (Gov5)	Academic literature (Eliasen et al., 2015) Commission White Paper on European Governance (EC, 2001) EU Protocol (No 2) on the Application of the Principles of Subsidiarity and Proportionality CFP Basic Regulation (partly Art. 3a/b)
	Simplicity of rules (Gov6)	Academic literature (e.g., Griffin, 2013) EU Better Regulation Toolbox (EC, 2015)
	Compliance mechanisms (Gov7)	Academic literature (Ostrom, 1990) Public institution (WBGU, 2013) CFP Basic Regulation (Art. 36.1)

(Continues)

TABLE 1 (Continued)

Dimension	Criterion	Origin
Evidence The evidence dimension refers to the question how uncertainty and risks are dealt with in the fisheries system	Precautionary approach (Ev1)	Academic literature (Proelss & Houghton, 2012) CFP Basic Regulation (Art. 2.2) International law (UNFSA)
	Adaptive management (Ev2)	Academic literature (e.g., Armitage, 2007; Folke et al., 2005; Grafton et al., 2007) Public institution (WBGU, 2013)

insufficient, the time trend was evaluated according to the judgement of the authors. As for the status quo, the time trend was evaluated as positive, neutral or negative. "Positive" in this case means an improvement in performance over time, "neutral" means no clear direction regarding the performance over time, and "negative" means a worsening performance over time. Different base years had to be chosen for the trend analysis, due to the different lengths of the time series available to evaluate the different indicators.

2.3 | Applying the analytical framework to the CFP

We used a wide range of data published in EU reports (e.g., EEA, 2015b, 2017c; STECF, 2017a, 2017b) and in academic publications (e.g., Carpenter & Kleinjans, 2017; Carpenter et al., 2016; Ounanian & Hegland, 2012) to evaluate the CFP's performance regarding the selected criteria. To verify and complement the information contained in written sources, we conducted qualitative interviews on selected aspects with fisheries experts from different backgrounds (academia, administration, non-profit organizations, and fisheries industry). The data sources used for the evaluation of each sub-criterion and indicator respectively are listed in the Supporting Information.

To make statements about the 17 criteria of our analysis, we aggregated the assessments of the individual indicators. A positive assessment was rated with three, a neutral assessment with two and a negative assessment with one. These values were added up and for each criterion divided by the number of indicators. Resulting values between 1 and 1.49 were rated as "negative," between 1.5 and 2.5 "neutral," and values between 2.51 and 3 were rated as "positive." We thus decided to apply the same weight to each indicator. This approach was chosen since there was no compelling basis for systematically assigning different weights to individual indicators. In fact, the weighting of criteria in this case is not a methodological problem but a normative decision regarding which objectives of fisheries governance should be prioritized. The CFP Basic Regulation (European Parliament & European Council, 2013) does not answer this question since it does not prioritize the objectives of fisheries governance. In the academic literature, there is no consensus regarding the prioritization of the objectives of fisheries governance, either (Bromley, 2009; Grafton et al., 2007; Hilborn et al., 2015). Arguably scientific discourse can only provide a partial answer to this question.

The aggregation of the individual indicators may be criticized because the units or categories underlying the indicators are different (e.g., the existence/absence of cross-sectoral institutions vs. the homogeneity/heterogeneity of decision-making processes). This problem arose because the relevant concepts of fisheries governance such as the ecosystem approach, adaptive management and the precautionary approach are multidimensional, that is they cannot be measured by one indicator alone. In order to answer relevant questions (e.g., "does the CFP implement the ecosystem approach?"), it was therefore necessary to aggregate indicators which may have different underlying units. This approach was chosen as the "lesser evil" compared to an approach which discusses individual indicators but does not make statements about the relevant concepts in the debate about fisheries governance. Aggregation further enabled grouping the criteria based on their status quo and trend to identify those aspects in most need for reform.

3 | RESULTS—EVALUATION OF THE EU FISHERIES GOVERNANCE SYSTEM

3.1 | Overall performance of the wider Common Fisheries Policy system

The evaluation of the Common Fisheries Policy (CFP) showed that there is no criterion which has a positive status quo while 10 criteria were assessed as "neutral" and seven as "negative" (see Figure 1). The CFP thus still has important deficits regarding the applied criteria. These deficits are distributed relatively evenly across the different dimensions (ecological, economic, social, good governance and evidence). The criterion *simplicity of rules* stands out because it is the only criterion which shows both a negative status quo and a negative trend. The complexity of rules therefore emerges as a priority for the reform of the CFP. Tackling the criterion of complex rules will have wider implications, as so far this complexity has negatively affected the performance of the CFP regarding other criteria such as transparency and compliance mechanisms (Peñas Lado, 2016, p. 193).

Regarding the trend in the CFP's performance, the picture is somewhat more positive. Five criteria show a positive trend, 11 show a neutral trend and one criterion shows a negative trend. When only considering the criteria that were fully covered by the CFP's own objectives (see Table 1), this positive overall trend is more pronounced

with five criteria trending positively and five criteria showing a neutral trend. The criteria which are not (or only partially) covered by the CFP's objectives however do not show a positive trend (six show a neutral trend and one shows a negative trend).

3.2 | In-depth analysis—evaluation at the level of indicators

3.2.1 | Negative status quo, negative trend

Good governance

Regarding the *simplicity of rules* (words in italic indicate a specific criterion) experts broadly agreed that CFP rules are highly dense, technical, and in many cases indeterminate and have become more complex and numerous since the inception of the CFP (Pastoors, 2014; Peñas Lado, 2016) (Gov6.1.1; these numberings highlight a specific indicator and help to find the indicator in the Supporting Information). Not only has the number of words in the Basic Regulation steadily grown, but also the amount of technical measures has continuously increased. In total, 90 technical measures regulations or regulations containing technical measures (e.g., management plans) have been enacted by the EU across the different sea basins within 36 years, on average about two per year (EC, 2016a).

3.2.2 | Negative status quo, neutral trend

Economic

For the *user-pays principle*, the evaluation showed that the users of fisheries resources largely do not pay. While not uncommon in other fisheries systems (e.g., Canada in the case of cost recovery (cf. Marchal et al., 2016)), EU member states neither capture the resource rent generated (Ec3.1.1), nor is the industry involved in covering costs for fisheries management (Carpenter & Kleinjans, 2017; Marchal et al., 2016) (Ec3.2.1).

The evaluation of the *resource-efficiency* criterion showed that environmental resources are not dealt with efficiently under the CFP. Compliance with the landing obligation is low across EU fisheries since on-board monitoring tools—widely considered as key for

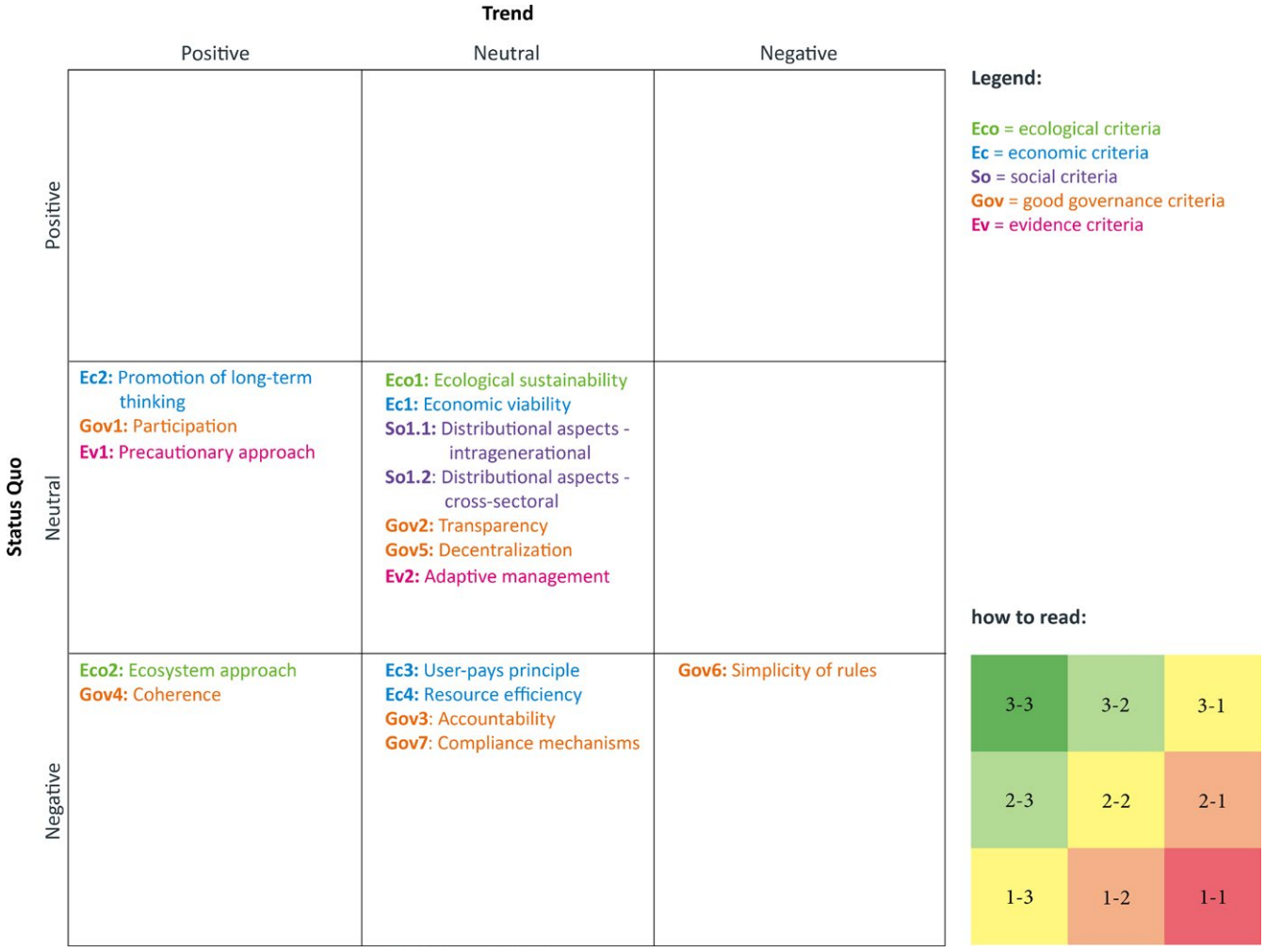

FIGURE 1 Performance of the CFP based on the 17 criteria of the analytical framework (evaluated as positive/neutral/negative) currently (status quo) and over time (trend); abbreviations (e.g., Ec2) represent the numbering of the 17 criteria [Colour figure can be viewed at wileyonlinelibrary.com]

compliance with the landing obligation—are not mandatory in any member state (Borges, 2016; EC, 2017a) (Ec4.1.1). Also, most fisheries are fuel tax exempted under the Energy Taxation Directive (Borello, Motova, & de Dentes Carvalho, 2013), providing few incentives to become more fuel-efficient (Ec4.2.1).

Good governance

Accountability in the CFP system was assessed as low because no accountability mechanisms apply to the fisheries ministers and the decision-making process under the CFP (setting of Total Allowable Catches (TACs)) (Gov3.1.1). Two important reasons for this are the lack of transparency in the Council of the EU (Transparency International, 2016) (Gov2.1.1) and the fact that environmental nongovernmental organizations do not have legal standing before the European Court of Justice (ECJ), that is, they cannot sue the Council for violating principles of the CFP (Proelss & Houghton, 2012) (Gov3.1.1).

Compliance mechanisms for enforcing CFP rules display important deficits, although some of them have been improved over the last decade (ECA, 2007, 2017). Weaknesses of the current mechanisms are the lack of coverage of small vessels in the Vessel Monitoring System (ECA, 2017) (Gov7.1.1), the long delay between rule violations by member states and penalties imposed by the ECJ, (Gov7.2.1) the lack of dissuasive penalties at the member state level and the uneven application of penalties across member states (ECA, 2017) (Gov7.3.1).

3.2.3 | Negative status quo, positive trend

Ecological

Regarding the implementation of the *ecosystem approach*, the EU lacks cross-sectoral institutions that could substantiate an integrated maritime policy (Env.2.1.1). A further problem is the asymmetry of decision-making processes between environmental (more decentralized) and fisheries policy (more centralized) (van Hoof, 2015) (Env2.2.1). Fisheries management is still largely based on single-species assessments and single-species TACs, although the International Council for the Exploration of the Sea (ICES) increasingly provides ecosystem assessments and mixed-fisheries advice (Env2.5.1).

Good governance

Regarding the internal *coherence* of the CFP, the amount of harvesting capacity-enhancing subsidies—considered as undermining efforts to reduce over-capacity and to conserve fish stocks—is at least twice as high as the amount of "beneficial" subsidies for management and research (Sakai, 2017; Sumaila, Lam, Le Manach, Swartz, & Pauly, 2016) (Gov4.1.1). Regarding the CFP's coherence with other policy areas, the CFP's measures to protect the marine environment are insufficient which conflicts with EU environmental policy (e.g., EC, 2009a, 2011). This is reflected for instance in the small area covered by no-take zones for fishing (EEA, 2015b) (Gov4.2.1). At the same time, some subsidies have been phased out and an increasing number of measures has been adopted to protect the marine environment (Peñas Lado, 2016).

3.2.4 | Neutral status quo, neutral trend

Ecological

Ecological sustainability performs moderately since TAC setting is still not fully in line with scientific advice (Carpenter et al., 2016) (Env1.1.1) and the number of stocks fished above Fmsy (the fishing mortality that leads to Maximum Sustainable Yield) was still about 40% in 2015 (STECF, 2017a, pp. 6–8) (Env1.2.1). Moreover, the progress of the CFP towards the target of achieving Fmsy for all stocks by 2020 will probably be insufficient to achieve the target (STECF, 2017a, p. 7).

Economic

The *economic viability* of the CFP system is characterized by divergence considering that inter alia wages generated are unstable for the small-scale fleet (SSF), though stable or increasing across the EU large-scale fleet (LSF) (STECF, 2017b) (Ec1.1.2 and Ec1.2.3).

Social

Distributional aspects—intragenerational were evaluated to have a mixed performance considering the relationship between the SSF and LSF, genders and commercial and non-commercial fisheries. For instance, 2% of the European Fisheries Fund's budget was spent on measures targeting the SSF (DG MARE, 2017a), undermining their competitiveness vis-à-vis the LSF (Schuhbauer, Chuenpagdee, Cheung, Greer, & Sumaila, 2017) (So1.1.2). In eight member states, social protection for contributing partners is still voluntary under Directive 2010/41/EU, limiting access to social benefits (e.g., pensions) for this group (Barnard & Blackham, 2015; EIGE, 2016; EP & European Parliament & European Council, 2010) (So1.1.4).

Distributional aspects—cross-sectoral accounts for recreational fisheries which are not acknowledged as a sector under the CFP, although in some cases catches from recreational fishing are comparable or may even exceed those of commercial activities (see for instance Strehlow, Schultz, Zimmermann, & Hammer, 2012) (So1.2.1). More positively evaluated was that recreational catch has been incorporated into ICES scientific assessments and advice since 2016 (EC, 2016b; and expert opinion) (So1.2.2).

Good governance

Transparency in the CFP's *political process* is low due to the lack of transparency in the CFP's key decision-making body, the Council. However, transparency has improved ensuing the creation of the Advisory Councils (AC) (Ounanian & Hegland, 2012) (Gov2.1.1). *Scientific transparency* has improved due to increased transparency of ICES and the participation of scientists in ACs (Dankel, Stange, & Nielsen, 2016, p. 214; EC, 2008, p. 7) (Gov2.3.1).

The EU fisheries system was *decentralized* to a limited extent with the 2002 and 2013 CFP reforms. Still, central management tasks remain at the EU level, although some of them (e.g., the setting of TACs) could be taken at the regional level (Gov5.1.1). The creation

of regional groups has also raised new problems since they were not allocated additional resources (Eliasen, Hegland, & Raakjær, 2015; van Hoof & Kraus, 2017). The transfer of management tasks to the fishing sector plays almost no role, although it could serve as a measure to reduce centralization and bureaucracy, to strengthen the responsibility of the sector, and to achieve better informed management decisions, if introduced carefully as "effective devolution takes time" (Berkes, 2010, p. 489; EC, 2009b).

Evidence

Adaptive management requires a sound and updated evidence base (WBGU, 2013). The evidence which is collected under the Data Collection Framework (DCF) appears to be fragmented though. Only one member state fully complies with DCF requirements while a majority partially complies (EEA, 2015c; Le Quesne, Brown, De Oliveira, Casey, & O'Brien, 2013; expert opinion) (Ev2.1.1). Asymmetric revision cycles of legislation specifying the Basic Regulation (DCF, EU fisheries funds, multi-annual management plans, Control Regulation) appear as a further impediment for enhanced adaptive management. The majority of these regulations take more than 2 years to be streamlined with the reforms of the Basic Regulation (own analysis) (Ev2.2.1).

3.2.5 | Neutral status quo, positive trend

Economic

Incentives for *long-term thinking—planning security* were evaluated as having a mixed performance taking into account for instance that multi-annual management plans exist for the commercially most relevant stocks in the North and Baltic Seas, none exists for the Mediterranean and just one for the Black Sea, while parts of the commercially relevant stocks in Western Waters are covered by such a plan (DG MARE, 2015, 2017b; EC, 2017b) (Ec2.1.2-2.1.4).

Good governance

The ACs are the central institutions for *participation*, and they were assessed as relatively inclusive in a legal sense. Nonetheless, ACs in practice do not evenly represent the full spectrum of stakeholders since groups outside the political mainstream such as Greenpeace, Sea Shepherds, Cod Crusaders and Save Britain's Fish have declined to participate in RACS/ACs and other groups (such as the small-scale sector) in many cases lack the resources to effectively participate in ACs (Griffin, 2013, pp. 90–94) (Gov1.1.1). Most AC members have the perception that they "somewhat impact" (Ounanian & Hegland, 2012) fisheries management which points to an appropriate level of stakeholder influence (Gov1.2.1).

Evidence

The implementation of the *precautionary approach* shows a positive trend due to several improvements, such as the closer alignment of TACs to scientific advice, the reduction of the number of stocks that are outside safe biological limits, and the introduction of the ICES data limited stocks approach. Despite these improvements, the status quo was assessed as neutral since the percentage of stocks outside safe biological limits was still 32% in 2015 (STECF, 2017a) (Ev1.2.1) and due to the lack of a data-deficient management procedure under the General Fisheries Commission for the Mediterranean (Le Quesne et al., 2013) (Ev1.1.1).

4 | DISCUSSION

4.1 | The Common Fisheries Policy as a case study

Applying the analytical framework, our analysis identified five priority areas for improving the Common Fisheries Policy (CFP): *simplicity of rules*, *the user-pays principle*, *resource efficiency*, *accountability* and *compliance mechanisms*. These are criteria which are not met by the CFP (status quo assessed as "negative") and regarding which there has been no progress over time (trend assessed either as "negative" or "neutral"). In three of these areas,—*compliance mechanisms*, *resource efficiency* and the *user-pays principle*—the member states are mainly responsible for setting and implementing policy. Increasing the effectiveness of the CFP therefore not only requires improvements at the EU level but also at the member state level. How could improvements be achieved regarding the five priority criteria?

Several mechanisms could be used to *simplify the rules of the CFP*. First, simplification could be pursued at the level of policy instruments, that is through choosing management measures that are easier to administer than the current complex mix of catch limitations and technical measures. No-take zones could provide such an instrument even when the challenges involved in their design are considered (Roberts, Hawkins, & Gell, 2005). Second, simplification could be pursued by handing over responsibilities to the fishing industry through co-management and/or a reversal of the burden of proof (EC, 2009b; Eliasen et al., 2015). Third, a further regionalization of fisheries policy could be pursued by limiting EU level regulations to principles and objectives and limiting regional regulations to the respective sea region in question (Eliasen et al., 2015; van Hoof, 2015).

The main instruments to implement the *user-pays principle* are a landings tax (Carpenter & Kleinjans, 2017) or royalty auctions (Bromley, 2009). Both could be used to capture the resource rent for the benefit of society and to cover the costs of fisheries management. In order to maintain a "level playing field" between the fishing industries of the member states, an implementation of such measures would however have to be coordinated at the EU level. This calls for a stronger role of the EU regarding this economic aspect of fisheries.

With respect to improving the CFP's *resource efficiency*, the further implementation of the landing obligation would be the most important step for marine resources. This requires adequate monitoring (e.g., on-board cameras) and consistent and dissuasive penalties by the member states (ECA, 2017). More fundamental changes may however be required to address the causes of discarding, such as incentives for more selective fishing gears/techniques, a facilitation of quota swaps, or the redistribution of quotas so that they

better reflect the current pattern of catches. The level of fuel subsidies should be reduced in order to provide incentives for more fuel-efficient fisheries (Carpenter & Kleinjans, 2017). Again, this would require action at the EU level. A minimum level of taxation would have to be set together with repealing the provision which permits fuel tax exemptions for the fishing industry (Borello et al., 2013).

Also, improvements regarding *accountability* require changes that go beyond the CFP. Granting nongovernmental organizations (NGOs) the right to challenge decisions of the Council before the ECJ would be an important step towards more accountability. So far, the court has however denied NGOs legal standing in this context (Proelss & Houghton, 2012; Wakefield, 2016, pp. 197–203). There are several possible mechanisms through which NGOs could attain legal standing before the ECJ regarding decisions on fisheries policy. First, the ECJ's interpretation of the rules that govern legal standing before the ECJ (especially Art. 263(4), Treaty on the Functioning of the European Union) could evolve, although this seems unlikely (Proelss & Houghton, 2012; Wakefield, 2016, pp. 202–203). The second possibility would be a change in the EU treaties towards less restrictive rules regarding legal standing before the ECJ, though this seems equally unlikely. At this point in time, the 1998 Aarhus Convention appears to be a more feasible mechanism. This convention regulates *inter alia* the right of citizens to challenge decisions concerning the environment in court. The EU is a party to the Aarhus Convention; however, its legal act implementing the Convention (Regulation (EC) No 1367/2006) has been found to be insufficient by the compliance committee of the convention (Berny, 2018; Euractiv, 2017). If the EU addresses the findings by the compliance committee of the Aarhus Convention by amending the regulation, this could empower NGOs to challenge measures affecting the environment before the ECJ and thus strengthen *accountability* in the EU and also the CFP.

Another issue that goes beyond the CFP reform is the lack of *transparency* of the Council which is an obstacle to increase its *accountability*. Increasing the accountability and transparency of the regional groups (Baltfish, Scheveningen, etc.) however does fall into the remit of fisheries governance. Once more, this task lies mainly with the member states since the regional groups are not part of the institutional framework of the EU (Eliasen et al., 2015, p. 227).

Regarding the improvement of *compliance mechanisms*, several measures are required at the member state level. This includes more dissuasive penalties, a consistent application of the point system introduced by the Control Regulation, and more comprehensive monitoring of the fleet (ECA, 2017). At the EU level, the instrument of conditionality has recently been introduced, that is the possibility of making payments of the European Maritime and Fisheries Fund conditional on the compliance of member states and private beneficiaries (Peñas Lado, 2016, p. 335f.). If used consistently and proportionately, this instrument could contribute to improving compliance by reducing the time lag between rule violations and the imposition of penalties which occurs in the context of proceedings before the ECJ. A further strengthening of the European Fisheries Control Authority (EFCA) could also contribute to more consistent and efficient monitoring (EFCA, 2017).

4.1.1 | Variation of findings of the evaluation

The aggregate evaluation of the CFP should not disguise the large variations across the EU. The most obvious difference is that between different sea regions. By and large, fisheries management in the North and Baltic Seas performs better than fisheries management in the Mediterranean and Black Seas. This is for instance the case regarding the reduction of fishing mortality to Maximum Sustainable Yield levels, the implementation of multi-annual plans, and the evidence-base for relevant stocks. It must be borne in mind in this context that the geopolitical conditions for fisheries governance in the Mediterranean and Black Seas are more difficult than in the other areas of the CFP. These sea regions are shared with third parties many of which lack state capacity. Furthermore, the Mediterranean is not fully covered by the Exclusive Economic Zones of its riparian states since those have not established Exclusive Economic Zones which extend to 200 nm. This aspect further complicates the implementation of fisheries governance in this region. Finally, there is also variation across member states. Especially statements on the level of wages in the small-scale fleet are sensitive, where the average annual wage is €24.8, though Belgian fishers earn €74.9 and Cypriot fishers €1.4 thousand per year (STECF, 2017b).

4.1.2 | Knowledge gaps

The analysis revealed several knowledge and data gaps that made it difficult to assess the performance of the CFP. In many cases, it is not clear how rules on paper translate into implementing measures (e.g., how do rules translate into industry behaviour and how does this affect the state of the marine environment) (EC, 2009a, 2011; EEA, 2015c). Although this is a tall order, it should be the objective of future studies to move towards a better understanding of these processes. Further aspects such as macroeconomic viability (in terms of gross value added), environmental innovations, and CFP coherence with EU development policy were found to be relevant criteria but could not be included in the framework due to difficulties in defining indicator values and due to data limitations. Similar is the case with incentives for innovative fisheries regimes which are set out as a key criterion in future marine governance (cf. WBGU, 2013). However, systematically tracking them was difficult (see for instance DG MARE, 2017a, p. 8), and therefore they were not incorporated into the framework.

4.1.3 | Lack of precision of CFP objectives

Adding to Jennings and Rice's (2011) findings, the analysis revealed a lack of precision of the CFP's objectives. While the 2013 reform brought a clear objective regarding the state of fish stocks (Maximum Sustainable Yield), the objectives regarding the other dimensions of the CFP (economic, social, good governance, and evidence) remain vague (e.g., objectives have not been quantified or a deadline set). As a consequence thereof, indicators and thresholds may remain

unclear, hampering monitoring of these objectives. Especially regarding the economic dimension of the CFP, clearer objectives at the EU level should be defined since EU rules will be necessary to achieve economic objectives.

4.1.4 | Implications for fisheries governance beyond the CFP

A number of findings of the CFP evaluation are relevant for fisheries governance beyond the EU and especially for Regional Fisheries Management Organizations (RFMOs) which like the CFP manage transboundary fish stocks. The first important point is the shortcomings of the CFP in furthering *resource efficiency* and the capturing of the resource rent. These goals are not part of the "Kobe" criteria which drive the process of improving the effectiveness of RFMOs, either (FAO, 2015). Furthermore, the World Trade Organisation process to reduce harmful subsidies that inhibit resource efficiency and are costly to taxpayers has made little progress so far (Schuhbauer et al., 2017). Like the CFP, global fisheries governance therefore fails to produce benefits for society from a publicly owned resource (Belschner, 2015). A second important point is the area of *rule simplification*. In this respect, the CFP serves as a cautionary tale. As RFMOs further develop their legal frameworks as a response to the process of independent performance reviews (FAO, 2015), they have to avoid "micro-managing" fisheries and resist the tendency of creating new rules without repealing old ones. Finally, despite the weaknesses of the EU's compliance mechanisms, EFCA provides a positive example for managing inspections in fisheries in which multiple states are involved. According to a recent review, the agency has succeeded in performing a role as an "honest broker" between member states, the EC and the fishing industry (EFCA, 2017). EFCA can therefore provide best practices for RFMOs.

4.2 | The analytical framework

4.2.1 | Comprehensive evaluation

The analytical framework is distinct from previous frameworks by taking a more comprehensive and transparent approach to evaluate fisheries systems. By incorporating criteria along five dimensions (ecological, economic, social, good governance, evidence), elements were combined which in previous frameworks were partially covered or which addressed specific fisheries concepts (see for instance Castillo et al., 2016 and Grafton et al., 2007 with a focus on the ecosystem approach or WBGU, 2013 with a focus on ocean governance). With respect to CFP specificities, this holistic approach synthesizes evaluations which are currently carried out at separate venues (e.g., DG MARE, 2017a and STECF, 2017a assessments). While the framework does not address the interdependence between the criteria, applying a comprehensive set of criteria highlights the importance of considering both output and throughput criteria: good policy outputs cannot offset a bad throughput in terms of legitimizing EU fisheries policy (Schmidt, 2013). The framework moreover goes beyond existing approaches (such as Charles, 2001 or FAO, 2015) by first being transparent on the selected criteria, indicators and thresholds, and second by operationalizing and applying them, facilitating a more comprehensible evaluation.

4.2.2 | Transferability and applicability

We argue that the transferability of the analytical framework is essentially established through the 17 criteria. They address challenges encountered across multilevel and cross-boundary fisheries systems such as the free-rider problem, the need for taking into account interactions within the ecosystem as well as the need to create a common knowledge base about the resource. A number of criteria and indicators used in the framework meanwhile are widely acknowledged to unfold general validity for any effective commons governance. This concerns, for example, *adaptive management* (Folke, Hahn, Olsson, & Norberg, 2005; Plummer, Armitage, & de Loe, 2013) and *compliance mechanisms* (Chayes & Chayes, 1993; Ostrom, 1990). Assuming transferability is supported by the fact that criteria such as the *user-pays principle* are already implemented in other fisheries and resource contexts (see for instance Marchal et al., 2016). The criteria within the framework's good governance dimension can be further conceived as meta-criteria with validity for decision-making processes within a variety of policy fields and contexts (cf. OECD, 2012). For application in other fisheries systems, the indicators and thresholds used for evaluating the CFP likely require adjustment to reflect societally agreed preferences. At the same time, selection of indicators and thresholds needs to take into account availability and quality of data and information.

5 | CONCLUSION

In this paper, we introduced an analytical framework with 17 criteria along five dimensions (ecological, economic, social, good governance, evidence) to facilitate comprehensive evaluations of fisheries systems. We further operationalized the framework through indicators and thresholds, and tested it by application to the Common Fisheries Policy (CFP). As a set of generic criteria, it is conceptualized to inform about the performance of multilevel fisheries systems (as opposed to local or regional approaches). Such a comprehensive framework could function to synthesize existing but fragmented assessments (e.g., STECF's annual economic report broadly monitors the fleets' performance, while stock assessments by the International Council for the Exploration of the Sea focus on the ecological side of the CFP) and help develop a more comprehensive understanding of fisheries systems.

Applying the analytical framework to the CFP, the evaluation demonstrated that the policy overall performs relatively badly, that is there is no criterion which is fully met. In areas where the CFP displays a positive trend, it may be questioned whether progress can be considered fast enough in the context of growing pressures on the marine environment as well as growing social pressures in

parts of the EU fisheries sector. The criteria against which the CFP performed worst were accountability, the simplicity of rules, compliance mechanisms, the user-pays principle and resource efficiency. In order to improve the performance of the CFP, the focus of the next reform should be on these criteria, considering that changes in their performance can be expected to positively impact other CFP areas due to interlinkages among the criteria. In fact, improvements regarding any of the five criteria can be expected to improve the CFP's performance regarding ecological criteria (for instance, increased accountability would likely reduce the gap between scientific advice and actual Total Allowable Catches). The responsibilities for improving the performance of these criteria are widely distributed and require efforts at EU but also regional groups, and member states level, and even more challenging, go beyond fisheries-related competences. The focus on the aforementioned five criteria is based on the observation that they have not been met by the CFP and that their performance has not improved over time. This should not lead to the conclusion that efforts to improve the performance of other criteria should not be continued but rather that they should be extended to a wider range of criteria.

The large variation in the CFP's performance across regions and member states provides an argument for further developing regionalization and, related to that, regulation which better accounts for the different decision-making contexts and addresses in EU fisheries. This should not compromise the "level playing field" across EU regions, but allow for different regulatory regimes which acknowledge different ecological (e.g., species-rich vs. species-poor systems), socioeconomic (e.g., large small-scale fleet vs. primarily large-scale fleet), and political (e.g., only member states under EU fisheries regime vs. complex jurisdictional constellation) settings.

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Additional supporting information may be found online in the Supporting Information section at the end of the article.

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