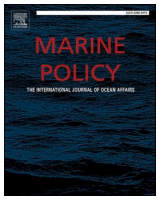
Marine Policy 150 (2023) 105530

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol



Full length article

# Perceptions in small-scale fisheries regarding institutional, economic, technological and environmental factors. Case study in North-Western Spain

Iria García-Lorenzo [a,b,1,*], Lucy Amigo-Dobaño [a], María Dolores Garza-Gil [a], Manuel Varela-Lafuente [a]

[a] ERENEA-ECOBAS, Department of Applied Economics, Universidade de Vigo, Spain
[b] Institute for the Oceans and Fisheries, The University of British Columbia, Vancouver, Canada

ARTICLE INFO

*Keywords:*
Small-scale fisheries
Perceptions of fishing agents
Fishing regulation

ABSTRACT

This paper focuses on the analysis of the perceptions of small-scale fisheries (SSF) agents in order to identify concerns and sensitivities regarding the relevant socioeconomic dynamics of this sector. The analysis is applied to a case study in north-western Spain. Specifically, in the study our aim has been to contrast the perception of aspects related to initiatives in fisheries regulation (main general initiatives highlighted in FAO reports, and some more upcoming actions) and, simultaneously, to the influence of factors significant for the SSF (economic, technological and environmental). Aspects such as globalisation and markets, technological advances in the sector, climate change or generational and gender matters are considered in the analysis. The results show that both global movements as well as local dynamics are present in the perceptions of agents (and probably in their strategies), which could reduce the effectiveness of general regulatory initiatives, conceived on scientific bases, but which have to be applied in diverse socioecological contexts. In this sense, this work joins other case studies in helping address fishery governance and management matters.

## 1. Introduction

Fishers' and fish farmers' action strategies are affected by different factors. In economic terms, the expectations derived from the financial and commercial scenario, the perception on the effects of recent technological advances, the evaluation of environmental impacts due to human action on the resources (including extractive activity), or the consideration of wide-ranging institutional actions to regulate and balance activity dynamics can all be particularly highlighted.

The aim of this study is to look closely at the perceptions of fishers and fish farmers agents in relation with this diversity of factors. The ultimate goal is to obtain information that contributes towards understanding their strategies better and weight the effects and efficiency of regulation on these marine activities. In any case, the article refers to factors of a general and global scope, both with regard to the need to define the research as well as for purposes of possible comparisons with other case studies.

In fact, the study's first point of reference is to be found in previous studies by the FAO. In this regard, the FAO [1] is carrying out evaluations on the scope of international agreements and initiatives in the marine fisheries sector that have had a significant impact in the last 25 years (1995–2020). The initiatives considered revolve around the approval of the Code of Conduct for Responsible Fisheries (CCRF) in 1995 and the consequences of its application [1,2]. But this article also aims to explore the perceptions and assessments of economic, technological or environmental factors, of a general nature, which have been highlighted as relevant in the specialised literature. With these considerations, it will be possible to compare sensitivities on the different fields and aspects selected.

However, there are other factors that could affect the behaviours and strategies of the participating agents in maritime fishery activities. These external factors could be of different kinds: i) economic (linked above all to globalisation and the specific forms of economic development that result from it); ii) political and institutional, in as much as other trends in

* Corresponding author at: ERENEA-ECOBAS, Department of Applied Economics, Universidade de Vigo, Spain.
*E-mail addresses:* iriagarcia@uvigo.es (I. García-Lorenzo), lamigo@uvigo.es (L. Amigo-Dobaño), dgarza@uvigo.es (M.D. Garza-Gil), mmvarela@uvigo.es (M. Varela-Lafuente).
[1] Permanent address: Department of Applied Economics, Faculty of Economics, Campus As Lagoas-Marcosende, University of Vigo, 36310 Vigo, Spain.

https://doi.org/10.1016/j.marpol.2023.105530
Received 28 June 2022; Received in revised form 23 January 2023; Accepted 31 January 2023
Available online 4 February 2023

this ambit (outside of those pertaining to fishing) might be impacting on fishery agents; iii) environmental (mainly the factors linked to the impacts of climate change); iv) scientific and technological, insofar as their transfer to the maritime fishery world could give rise to new trends and strategies [3,4].

Taking these considerations into account, our objective can be broken down into two differentiated lines of research: 1) similarities or differences in the results obtained in this study with respect to the general assessments or perceptions contained in the FAO reports, indicating, where appropriate, what should be added or qualified; 2) coincidences or differences observed in this study in relation to others in the specialized literature, referring to the specific aspects dealt with in this article.

In this context, firstly, this study aims to identify: i) relevant impacts of the main guidelines in world and European initiatives at institutional level (FAO, United Nations, European Commission); ii) main trends within the economic and social context of the maritime fishery ambit that could involve possible strategy changes and require new regulations at global, regional or local level. Then, as the principal objective of the study, based on this identification of the most significant factors and trends, we will present our research in a specific case study on perceptions among the direct agents involved in maritime fishery activities. The chosen case refers to a fairly significant fishing region in Europe: Galicia, in north-western Spain, which combines a certain complexity in its production processes with a relevant quantitative contribution in terms of production and employment. For this study, the focus of attention will be small-scale fisheries (SSF).

Consequently, the article is organised in the following way. Firstly, we aim to contextualise the scenario of reference for the case study, also in order to justify the analysis carried out and to know previous references on it. Then (Section 3), we will describe the method followed and the material used to develop our analysis about the perceptions of SSF agents. In Section 4, we will report the results obtained and subsequently (Section 5), we will reflect on the most relevant points to be considered and discussed. Finally, we will set out the study's most important conclusions.

## 2. Contextualisation and previous references

Now we will try to situate the most significant factors and trends that have characterised fishery dynamics in the last decades, resorting to a review of contributions to specialised journals in order to do so. We will refer, in particular, to the scenario proposed for each case study.

### 2.1. Fisheries policy framework and the situation of the marine environment

In the introduction, we referred to international agreements and initiatives of a global nature in the fisheries sector that the FAO brought to the forefront. To this can be added the parallel actions relating to the European Fisheries Policy, which are of particular significance for the case study [5,6]. According to its evaluations on the impact of said initiatives, this regulatory framework might have contributed towards correcting the trend of the results derived from marine fishery activities in the last 25 years, borne out by the following observations: 1) a strong tendency towards the improvement of fishery regulation (both land and maritime); 2) the significant development of aquaculture and stabilisation of capture fishery production [1,2].

The former's most powerful basis lies in the choice of the Ecosystem Approach to Fisheries (EAF) and Aquaculture (EEA) and in the use of target reference points in the fisheries as the main guide for regulation. It also includes fishers' participation, especially in the SSF insofar as decision-making processes are concerned, significantly increasing the presence of women in fishery processes.

The latter reflects the trends towards increased production in the aquaculture sector, in as much as improvements in the management of several capture fishery target species are achieved, halting processes that lead to over-fishing and causing a certain stabilisation in fishery production.

Additionally, and affecting both fishery and aquaculture processes, other factors accompanied and reinforced these trends. In particular: i) improvements in capture and post-capture practices (incidental catches and discards, traceability and health checks…), which had an impact in terms of the quality and safety of marine products; ii) recognition of the significance and future possibilities regarding the consumption of marine products, especially in high-value markets.

These regulatory initiatives are considered, on the other hand, to be attuned to the Sustainable Development Goals (SDGs) [7], especially with regard to SSF. As for SSF, the FAO considers that this segment provides direct and indirect livelihoods to millions of people all over the world, contributes increasingly to food supply on a global scale and is of great cultural significance. In addition, the FAO has published voluntary guidelines with the aim of improving sustainability in SSF [8,9].

But the state of resources and the marine environment is also affected by the effects of other human actions that led to the global warming process. This process is directly and indirectly affecting the marine environment and its living resources, as well as altering the usual conditions found in fishing and aquaculture activities [10–12]. In the particular area of SSF, specific studies are being carried out [13] on these matters, focusing on aspects such as the adaptive capacity fleets and fishing or fish farming methods, or the problems financing these transformation processes [14,15]. In fact, it will be important to analyse whether the fisheries policies developed in these processes are perceived by fisheries stakeholders as instruments that adequately balance fishers' welfare and conservationist objectives.

As a consequence of the growing perception of the effects of different human actions impacting on the marine environment and its resources, fisheries policies tend to be increasingly integrated into holistic approaches that simultaneously consider other factors and objectives, beyond the strictly fishing ones. This is observable in the SDG framework [7] and the initiatives linked to them, as well as in the actions stemming from the EU's Integrated Maritime Policy (IMP) [16–18] or, even more recently, from Blue Growth [19–24].

### 2.2. Globalisation, markets and technological advances in the fishing sector

The globalisation process underpinned by the intense commercial and financial opening-up since the last quarter of the 20th century has also impacted the fishery and aquaculture sector. This process is reflected more clearly in commercial activity, with the growth of international traffic and the increasing significance of new exporting countries [1,25,26]. But it can also be seen in capital flows: i) directly, in extractive fishing companies engaged in fishery and aquaculture activities; ii) more indirectly, with the growing importance of the big multinationals involved in the distribution and processing of marine products [27].

Within the specific scope of the SSF, commercial (and financial) trends have been perceived and analysed [25,28,29] with regard to two initially divergent scenarios: i) as a window of opportunity to offer specific SSF products, identified by their origin, their quality and their sustainability traits, contributing, as such, to local economic development; ii) as a scenario with unequal power structures and complex and diverse results, where SSF is the weak link in the value chain and, therefore, highly dependent on subsidy policies and financial inclusion programmes in order to protect it [29–31].

Recent studies in this context [32] have illustrated some problematic aspects: i) difficulties expressly identifying SSF production in the markets and separating it from industrial fishery production, aquaculture farms, imported products and even IUU fishing products [33,34]; ii) dominance in the market of some chains and some flagship products and the weakness or lack of capacity of SSF organisations in these situations.

In contrast, positive options are also highlighted [32]: i) expectations of new opportunities given the technical advances that have crept into the fishery sector (including SSF), concerning information, safety and the transformation of mechanical production processes; ii) the possibility of developing new production and trade diversification strategies, fomenting sustainability as value; iii) options for new lines of political action, in harmony with SSF's environmental sensitivity and other social and cultural values.

Increasing globalisation has also favored the acceleration of innovative processes of technological change. In this context, and with reference to this century, some advances and initiatives have merited special attention on behalf of maritime fishery activity analysts, among which we would emphasise three aspects: i) the rapid incorporation of information and communication technologies to the marine world and, more recently and specifically, the possibilities of digitisation; ii) initiatives tending towards a greater and more coordinated exploitation of living and non-living marine resources, within the SDG framework, through IMP or Blue Growth initiatives; iii) the global trend to incorporate certification and labelling processes to improve product quality guarantees and adapt to globalised markets, implemented from different guidelines (especially from FAO and EU) and executed through entities such as Marine Stewardship Council (MSC), Aquaculture Stewardship Council (ASC), Friends of the Sea, or Global Aquaculture Alliance [35–38].

In relation to markets, globalisation and its effects could affect traditional market network mechanisms such as the auctioning down as a system of first sale. At the same time, they may also be having effects on the patterns and intensity of fish consumption, as reflected in the increase in per capita consumption worldwide [39,40], which also applies to all commercial presentations (fresh, frozen, canned or other preparations). In any case, the changes do not affect all countries equally, and thus, at European level, the trend has stagnated, at least for the classic fresh or frozen products.

In both cases, references to SSF are present, especially in the studies referring to Europe. But as well as establishing its significance in terms of opportunities, some analyses have stressed the risks of the rapid expansion of marine activity, in terms of quick and far-reaching destabilising effects. These risks can be found in processes such as: i) displacement or monopolisation on the part of other economic agents; ii) environmental degradation and reduction in the availability of ecosystem services; and iii) in more generic terms, social and cultural impacts, as well as those derived from exclusion from decision-making processes (also with respect to specific groups such as women, indigenous populations).

### 2.3. Institutional action and social changes

Different trends and social values intersect in contemporary societies and affect institutions (formal and informal rules) and the attitudes and strategies of economic agents (in the maritime fishery area also) (3), while also being present in the problems (and goals) surrounding sustainable development and in the ways in which they can be addressed.

Obviously, going into this in greater detail exceeds the remit of this study; however, it might indeed be interesting to look a little more closely at some aspects which tie in with the article's aims. Among those which have merited attention, we would focus on the following: i) the analysis of SSF's specific values [41], centred firstly on the more selective nature of coastal fishing [4], although some of its fishing methods are not innocuous, in such a way that fishery regulation must ensure that the resources are protected [42,43]; ii) the importance of community-based fishing organisations in SSF, a key to cohesion and dynamics, but also not without its problems and conflicts [44,45]; iii) the need to include women and young people in socioecological sustainability and economic management problems, paying special attention to the social benefits of equality and involvement in new opportunities [46–50], as well as the problems arising from generational replacement and the eventual incorporation of immigrant workers [41,51].

On this point, different authors have established working and discussion guidelines [52], suggesting the appropriateness of exploring the perceptions of the agents or groups directly affected. Of these guidelines we would emphasise: i) the evaluation of the general trend of regulatory interventions with different roles and levels of involvement in the participation of users, as well as the evaluation of the efficiency of these actions [53–55]; ii) differences and adjustments among the implications of the bio-ecological bases of regulation (for example, ecosystem-based management) and the implications of co-management systems [56], which may be particularly relevant when guilds or community-based organisations are given more prominence [57].

### 2.4. Local references relating to the case study

The Autonomous Region of Galicia, in north-western Spain, is one of the EU's main fishing regions [58], which has also been a frequent object of study. The development of this sector has been uniquely conditioned by the characteristics of the exploitable resource systems in the regional maritime waters. Galicia boasts both open marine waters and relatively deep and wide estuarine areas (the so-called Rias), with conditions conducive to upwelling and the development of different fish, crustacean and mollusc populations [59]. We can differentiate between species that are sedentary (such as the octopus, clam, cockle, oyster or mussel, among others) and those that are not (tuna, monkfish, megrim, hake, sardine, horse mackerel and Atlantic mackerel), a characteristic that conditions the type of fishing, regulation and the definition of exiting rights with regard to the resources [57].

Related to the object of the case study, this coastal fishing is based on gear such as purse seine, longline and trawl, in the bigger vessels, with more simple gear used by the smaller vessels. For its part, shellfishing involves elementary structures and gear; differentiating between shellfish harvesting on foot, which is very traditional and uses elementary equipment on the beaches along Galicia's coastline, and by boat, which takes place in the rias using small vessels with slightly more specialised gear [59]. Other farming methods include somewhat more complex floating structures, known as "bateas", which have provided significant mussel production [60–62].

In this scenario, SSF plays a significant role. Specifically, there are 4272 registered fishing vessels in Galicia, of which 3800 are classified in the artisanal category (with an average of 2.30 GT and 21.45 kW), and another 196 vessels fall within the categories of purse seine, bottom-set longlines and gillnets (with averages of 48.10 GT and 156.24 kW) [63]. SSF represents 63.32% of total employment in the fisheries sector (equivalent to full-time) [58].

In relation with resource governance, fisheries' management in Galicia is conditioned by its membership of the European Union (obliged, therefore, to adhere to norms relating to the Common Fisheries Policy) [64], and by the organisation of the Spanish State itself into Autonomous Regions. This organisation involves the delegation of certain management competences to the governments of these Autonomous Regions, among which are to be found those referring to interior waters and shellfishing activities. To this end, different actors participate in Galicia's fishery resource governance, including both Public Administrations (European, national and regional), fishers and shellfish gatherers, small fishing companies and fish farms, and different organisations [57].

In the specific case of SSF, the most traditional and relevant organisational figures are the so-called "cofradías". These organisations bring together small-scale fishers and shellfish gatherers. Through these organisational structures, they can implement collective strategies to share and benefit from the use and exploitation of the marine resources available, as well as carry out a business activity. Galicia has 63 cofradías, with 12,734 members [65].

In the case of mussel production, the first association-based

structures in the sector arose in the 1970 s and 80 s with the aim of acquiring the capacity to negotiate with administrations and markets. After various different internal processes, primary mussel producers' associations currently exist, which in turn can be integrated in other larger association-based organisations (as producers' organisations or federations). There are currently 3300 bateas in Galicia (almost all single-family owned, located in 60 farms throughout the rias). Mussel producers' associations range in size and degrees of presence and activity, and the main (though not only) criteria for their initial formation is geographical proximity. Of these, 60% have fewer than 50 members, 11% have between 150 and 300 members, and the rest (29%) fall somewhere in between [61].

With regard to Galicia's SSF sector, it is also worth mentioning the appearance of a more recent actor: the Fisheries Local Action Groups (FLAGs). These groups began to emerge throughout the European Union after 2007 and the inclusion of a new territorial and local development perspective in the Common Fisheries Policy. They have been established at regional level and their current function is to manage the European Maritime and Fisheries Fund's Axis 4, aimed at promoting the sustainable development of fishing zones [66]. The FLAGs seek to represent a new, more complex, plural and inclusive system of territorial governance that incorporates new management formulas and foments the participation of different fishery and non-fishery agents in local development [67]. Galicia helped pioneer the creation of these groups in Spain, with a process that began between 2008 and 2009, currently boasting 8 FLAGs spread out along the coastline [68].

## 3. Methods and materials

On the basis of the contextualisation carried out, we can identify the main relevant questions in the aspects we want to subject to the perception of the fishery agents related to our case study. Considering these issues, which have aroused the interest of specialised researchers, the questions (hypotheses) to be evaluated have been defined in the different sections. They will also be the main reference point when it comes to discussing the results.

To be more specific, the perceptions will be studied more closely with regard to the following aspects: the extent to which fishers and shellfishers share the FAO's optimistic evaluation of the results derived from the application of the broad general guidelines regulating the activity; whether institutional processes (rules and control, degree and means of fishers' participation, post-catch product processing…) are adequate; whether trends that cause imbalance to the markets exist and whether trade regulation is adequate; whether the impacts of climate change are being correctly and sufficiently addressed; whether women's presence and representation in sector activity has changed and whether young people are being incorporated; and whether significant differences per activity segments and product types are perceived. Other questions will complement these lines of research, and in addition, it will be verified whether other aspects we have drawn upon from other authors' approaches emerge.

The organisation of the questionnaire drawn up takes into account: i) general aspects of the fishery situation; ii) specific aspects related to the abovementioned identification of relevant subjects; iii) a more in-depth exploration of trends in commercial products and agents. Each of the themes is broken down into a series of specific questions (39 in total), which are reflected in Tables 1–6. Furthermore, the questionnaire enables those surveyed to add explanatory comments to the answers in each theme (see Appendix I).

Bearing in mind the representativeness of the organisations mentioned in the section above, within Galicia's small-scale fishery sector, the population that is the subject of study and sampling focused on: i) the cofradías (CFs), which group together fishers and shellfish gatherers in different proportions, according to the specificities of the place where each organisation is located; ii) the Fisheries Local Action Groups located in Galicia's coastal areas (FLAGs); and iii) the mussel producers' associations (MPAs) that operate in the Galician rias. The responses to the questionnaires were given by representatives from these organisations, persons with positions of responsibility in their respective entities (either by being elected members of the governing bodies, or by having a management position and capacity in the entity). In this way, the information on perceptions was gathered by means of personal interviews and electronic deliveries addressed to these representatives, complementing the stratified questionnaire.

The survey was directed at organisations overall, without establishing any differentiation in terms of their size or possible specialisation, on the understanding that the study's aim is to offer a general overview of the dynamics of the sector on the part of SSF agents as a whole.

The number of questionnaires finally completed (in July, August and September 2021) stood at 61 CFs, 8 FLAGs and 11 MPAs, with a success rate (responses obtained out of the total number of questionnaires administered, calculated in accordance with the registers available in each case) of 96.8%; 100% and 73.3%, respectively. The sample was adapted to some socio-demographic criteria, in particular taking into

**Table 1**
GENERAL EVALUATION (DEGREE OF INTENSITY/IMPORTANCE) OF TRENDS IN FISHING AND AQUACULTURE.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (in brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| -1. economic activities in the sea: (they have increased in importance and will continue to do so) | 2.41 (1.02) | 2.88 (0.99) | 3.36 (0.81) |
| -2 importance/possibilities of SSF: (currently there is more recognition of SSF in fisheries policies) | 2.11 (0.93) | 2.63 (0.74) | 2.60 (1.03) |
| -3. management instruments in SSF: (degree of adequacy for sustainability) | 2.54 (1.12) | 2.63 (0.52) | 2.60 (1.12) |
| -4. capacity of scientific knowledge to develop new solutions: (these measures could promote compliance with the SDGs) | 2.69 (0.96) | 2.63 (0.74) | 2.55 (0,52) |
| -5. degree of conflict of fishing with other activities: (there are no conflicts, nor are any foreseen in the short term) | 2.39 (1.27) | 2.38 (0.92) | 2.70 (1.10) |
| -6. increase in importance of distortions in the first-sale market: (distortion due to some buyers' excess power) | 3.22 (1.13) | 3.88 (0.64) | 3.27 (0.90) |
| -7. large competitors in global markets: (countries and companies with more weight have altered the situation of the markets) | 3.52 (0.99) | 3.63 (0.52) | 3.40 (1.14) |

SOURCE: Drawn up by the authors from the results of the questionnaires. IN ALL TABLES, CFs: Cofradías; FLAGs: Fisheries Local Action Groups; MPAs: Mussel Producers' Associations; SD: Standard Deviation

**Table 2**
EVALUATION OF THE STATE OF THE RESOURCES AND RESULTS OF REGULATION.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (in brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| -8. current state of fish stocks (target species): (it is satisfactory) | 2.44 (0.85) | 2.63 (0.52) | 2.45 (0.52) |
| -9. current degree of impact of SSF on the resources: (it is scarcely significant) | 2.69 (0.96) | 2.88 (0.83) | 2.73 (0.90) |
| -10. degree of impact of human action on the marine environment: (it alters it significantly) | 3.64 (1.13) | 3.75 (0.71) | 3.91 (0.94) |
| -11. degree of impact of control measures with regard to the viability of SSF in the short term: (the specific measures are causing problems) | 3.03 (1.02) | 3.25 (0.71) | 2.80 (1.13) |
| -12. effectiveness of the Ecosystem Approach to Fisheries (EAF): (it will have positive effects on conservation) | 3.08 (1.04) | 3.88 (0.99) | 3.00 (0.63) |
| -13. effectiveness of the policy on discards (EU): (it will have positive effects on conservation) | 2.48 (1.19) | 3.38 (1.30) | 2.56 (1.45) |
| -14. fishers' participation in SSF management: (more participation will favour sustainable management) | 3.56 (1.12) | 4.00 (0.76) | 3.18 (0.98) |

Source: Drawn up by the authors from the results of the questionnaires

**Table 3**
PERCEPTIONS ABOUT COMMERCIAL, ENVIRONMENTAL AND TECHNOLOGICAL ASPECTS.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (in brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| -15. regulation of markets and commercial traffic: (it is adequate in SSF) | 2.43 (0.92) | 2.38 (0.74) | 2.82 (0.75) |
| -16. health controls in the fish trade: (regulation is fair and efficient in SSF) | 2.74 (0.85) | 2.50 (0.53) | 2.91 (0.94) |
| -17. traceability measures: (they will have positive effects on sector activity) | 3.8 (0.98) | 4.13 (0.64) | 3.73 (1.19) |
| -18. impact prevention and palliation measures (changes) with regard to climate: (they are efficient and fair in SSF) | 2.28 (0.76) | 1.88 (0.35) | 2.18 (0.60) |
| -19. control measures on pollution from plastics and waste: (they are efficient and fair in SSF) | 2.30 (1.09) | 2.38 (0.74) | 2.18 (0.40) |
| -20. evaluation of effects of the Blue Growth initiative: (it will be positive for SSF) | 2.82 (1.17) | 3.13 (0.83) | 2.30 (0.94) |
| -21. impact of advances on fishing and aquaculture equipment and installations: (they have improved in the last 10–15 years) | 3.77 (0.80) | 3.75 (0.46) | 3.73 (0.65) |
| -22. impact on production processes: (they have improved in the last 10–15 years) | 3.36 (1.00) | 3.88 (0.64) | 3.18 (0.75) |
| -23. impact on conservation and processing techniques: (they have improved in the last 10–15 years) | 3.69 (0.81) | 3.88 (0.83) | 3.45 (0.82) |
| -24. impact of new information systems on fishing and aquaculture: (they have improved in the last 10–15 years) | 3.97 (0.87) | 4.38 (0.74) | 3.36 (0.92) |

Source: Drawn up by the authors from the results of the questionnaires

**Table 4**
EVALUATION OF THE SITUATION IN QUESTIONS OF GENDER AND YOUNG PEOPLE.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (in brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| - 25. advances in gender equality in the fisheries sector: (gender discrimination has been eliminated in the activity and decision-making processes) | 3.05 (1.10) | 2.75 (0.89) | 2.64 (1.29) |
| -26. advances in fisheries associations and organisations: (in Galicia they are notable for the presence and recognition of women) | 3.43 (0.96) | 3.25 (0.71) | 2.55 (1.13) |
| -27. evaluation of systems of incentives and opportunities for young people: (they encourage young people to work in the sector) | 2.25 (0.89) | 2.13 (0.64) | 2.00 (0.63) |
| -28. impacts of new technologies on future working conditions: (they can contribute towards improving fishers' working conditions) | 3.52 (1.01) | 3.75 (1.04) | 3.91 (0.54) |

Source: Drawn up by the authors from the results of the questionnaires

**Table 5**
EVALUATION OF RELATIVE IMPACTS (ON SSF) OF DIFFERENT AGENTS IN THE VALUE CHAIN.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (between brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| -29. large food chains: (they have improved their weight and presence) | 3.43 (0.90) | 4.00 (0.00) | 3.82 (0.87) |
| -30. large distributors specialising in marine products: (they have improved their weight and presence) | 3.30 (0.74) | 3.63 (0.74) | 3.09 (0.83) |
| -31. retail distributors: (they have improved their weight and presence) | 2.95 (0.78) | 2.63 (0.74) | 2.64 (0.50) |
| -32. processing companies: (they have improved their weight and presence) | 3.21 (0.88) | 3.38 (0.74) | 3.64 (0.81) |
| -33. fishing companies (non-SSF): (they have improved their weight and presence) | 2.66 (0.75) | 3.00 (1.20) | 2.73 (0.65) |
| - 34. associations and organisations common to SSF: (they have improved their weight and presence) | 2.61 (0.86) | 2.88 (0.83) | 2.55 (0.69) |

Source: Drawn up by the authors from the results of the questionnaires

**Table 6**
EVALUATION OF TRENDS IN DIFFERENT COMMERCIAL PRODUCTS.

| Specific questions formulated and sense of the specific proposition subjected to evaluation: (in brackets) | CFs. Mean (SD) | FLAGs Mean (SD) | MPAs. Mean (SD) |
|---|---|---|---|
| -35. fresh products: (they have gained importance and presence in the markets) | 3.51 (1.01) | 2.88 (0.99) | 3.00 (0.89) |
| -36. frozen products: (they have gained importance and presence in the markets) | 3.25 (0.81) | 3.38 (0.74) | 3.45 (0.52) |
| -37. canned products: (they have gained importance and presence in the markets) | 3.43 (0.81) | 3.25 (0.71) | 4.18 (0.75) |
| -38. semi-processed or pre-cooked products: (they have gained importance and presence in the markets) | 3.28 (0.93) | 3.88 (0.64) | 3.91 (0.83) |
| -39. eco-labelled products: (they have gained importance and presence in the markets) | 3.43 (1.07) | 3.50 (0.93) | 3.55 (1.21) |

Source: Drawn up by the authors from the results of the questionnaires

account differences in the size of the organisations (by number of members and number of employees) and the participation of women in the governing bodies. This adjusted the size and stratification of the sample, avoiding possible biases or gaps in the interpretation of results (see also Appendix II with the frequency of responses per question and sector).

Given the high percentage of responses, the data presented in the sample is consistent to a large degree with the real situation of the different groups. In this sense, it can be seen that an average size is predominant within the CFs numbering between 50 and 249 members in 47.54% of the surveys), and that the size is lower in other organisations. The specific data on female participation is also highlighted, which exists in 77.05% of CFs, 54.50% of MPAs and 100% of the FLAGs.

In the questionnaire, following patterns used in previous studies [45,50,55,69–71], those surveyed were asked to respond to the different questions using a 5-point Likert scale. The perception of fishery agents was stratified as follows: level 1 – very unfavourable –, 2 – somewhat unfavourable –, 3 – quite favourable or indifferent –, 4 – somewhat favourable – and, the final level, 5 – very favourable –. The data obtained was processed statistically, by analysing per segment and per question the frequencies of occurrence of the response levels, obtaining the mean and the standard deviation in each case.

The aforementioned studies also consider different aspects or domains in their questionnaires (especially Gelcich et al. [69] and Bennett et al. [70] for its thematic scope), and are therefore given special attention in this article. As in these cases, additional comments and responses (as mentioned above) in each item under assessment are taken into account together with other qualitative information, in order to properly situate possible comparisons with other cases.

In fact, the questionnaire evaluates aspects and arguments (and weights or quantifies the degree of agreement of the interviewees) that are more frequently used in the official reports or in the papers we have reviewed and mentioned. However, the questionnaire open up and suggest the option of incorporating new arguments, aspects or details. Specifically, each section of the questionnaire included a section for free comments (see Appendix I), through which we recorded additional qualitative information.

In the data processing phase, we analysed this additional qualitative information together with the quantified information on perceptions, observing whether the comments were in line with or allowed us to qualify or complete the numerical information. Those comments or ideas that were most frequent and relevant were expressly included in the paper. Additional information from previous work is also incorporated to broaden the comparative framework and contextualise the circumstances of this or other case studies.

## 4. Results

The responses to the questionnaires allow us to detect, as an overall

assessment, that the perceptions present critical points in relation to the positive effects of the advances in fisheries regulation analysed and defended in the FAO reports. Likewise, these perceptions clearly weigh the importance of other aspects (commercial, social, environmental) that may be influencing fishers' attitudes and strategies and, as a result, the outcomes of the fishery in terms of sustainability and efficiency. This generic assessment can be qualified by looking at the response of the different groups analysed in the case study.

As a general approximation, it can be observed that the responses show relatively well defined and homogeneous trends in the three groups surveyed. This said, the moderate dispersion (standard deviation) in the responses of each group, which reflects fairly limited evaluative differences within them, stands out. However, we can observe some specific details per groups, as we will point out below, when analysing the results for each block of the questionnaire's themes and questions.

In the first block of themed questions, which reflects the general evaluation of those surveyed with regard to the degree of intensity or importance of certain tendencies in fishery and aquaculture activities, this tendency toward homogeneity can be observed. Looking at Table 1, this is particularly clear for questions 3, 4, 6 and 7. All of the groups tend towards a critical position (concern or disagreement, according to the sense of the questions). But it is necessary to establish small differences in the remaining questions: in question 2, cofradías are more critical than the rest; in question 5, the mussel producers show the most mistrust with regard to the inexistence or effects of tensions and disputes with other activities; in question 1, differences in criteria can be observed. Here, in particular, the majority of cofradías (60.80%) disagree or strongly disagree that marine activities are becoming more important, while in the FLAGs and the MPAs this percentage drops to 25% and 9,1%, respectively.

In the questions in the second themed block (Table 2: evaluation of the state of the resources and regulation), we can see moderately critical homogeneous evaluations of the state of the resources and the impacts of certain actions, as well as with regard to the relevance of the ecosystem approach (considered positively). However, some significant differences in the responses on policies related to control, discards and levels of participation in management can be observed. While in general there is a critical stance regarding policies implemented by the EU, the position is more well defined in CFs and FLAGs (especially prone to increasing the degree of participation in management, and with a high level of consensus) and less so in the MPAs. Worth mentioning is the relatively high value of the standard deviation in the question on discards, reflecting, in this case, a high degree of variability in perception.

Moving on to focus on the blocks of relevant specific aspects (Tables 3 and 4), we would highlight i) homogeneous values in all of the commercial questions, the high level of agreement with the importance of measures relating to traceability stands out; ii) homogeneous values in the first two environmental questions (18, 19), and disparities in the perceptions on the Blue Growth initiative, with high levels of standard deviation; iii) high levels of agreement with the importance of technological impacts set out in the questions (21−24) in said block, with some homogeneity and a low rate of dispersion in the responses; iv) homogeneity and a high level of agreement in the responses (Table 4) on young people, while more differences in the questions relating to gender appear (CFs and FLAGs are prone to highlight the presence and recognition of women in the activity, but the MPAs, less so).

The analysis of the results of the surveys insofar as the evaluation of relative impacts (in SSF) of different agents in the value chain is concerned shows a generalised perception that its relative significance is improving, more pronounced in the large food chains, large distributors and processing companies, and less so (or not perceived at all) in fish retailers, companies and organisations (Table 5).

Finally, regarding the evaluations on trends in different types of commercial products, the general appreciation is that the products that are the subject of this question are gaining market importance and presence (Table 6). This is more pronounced and unanimous for semi-processed or pre-prepared and eco-labelled products but is also significant in the rest, although with more nuances: the MPAs highlight the trend in canned products, and the CFs do the same with fresh products, which, in contrast, generate some doubts in the other segments.

In addition, with the aim of studying perceptions more closely, a segment analysis was proposed to determine the possible associations between variables and whether said perceptions are independent of the sociodemographic characteristics of those surveys. The focus was placed on the size of the organisation and on the sample of the CFs, the segment with the most representativeness and homogeneity. A contingency analysis was carried out and the relationship of dependence was tested for the significant variables by using Pearson's Chi-Square and Likelihood statistical test, calculating the differences between the frequencies observed and those expected from the variables in the sample. Furthermore, Fisher's exact test was carried out, considering a significance level of $\alpha = 0.10$ [72–74].

These results demonstrate that, for most of the themes, the size of the organisation would not appear to significantly influence the perceptions of those surveyed. The null hypothesis can only be rejected and the existence of association hypothesis accepted (for significance levels of 10%) between the size of the organization and the perceptions referring to commercial and environmental regulations, and to advances in knowledge and technology. In particular, said results are shown in Table 7, pointing especially to a statistically significant relationship between the organization size and the measures relating to traceability, the effects of the Blue Growth initiative, and the impact of technology in production processes and canning techniques.

## 5. Discussion

### 5.1. General questions

In the studies on fisheries management, other aspects have been added to the initial or basic management problem, focused on efficiency and sustainability goals. The review of literature on fisheries management enables us to identify the following problems individually:

**Table 7**
PERCEPTIONS IN TERMS OF THE SIZE OF THE ORGANISATIONS. QUESTIONS CHOSEN.

| Commercial regulation | | | | |
|---|---|---|---|---|
| 17. adequacy of traceability measures | | | | |
| | Value | df | Asymp. Sig. (2 sided) | Exact Sig. (2 sided) |
| Pearson Chi-Square | 12.376 | 8 | 0.135 | 0.114 |
| Likelihood Ratio | 14.520 | 8 | 0.069 | 0.082 |
| Fisher's Exact Test | 12.048 | | | 0.096 |
| Environmental regulation | | | | |
| 20. evaluation of effects of the Blue Growth initiative | | | | |
| | Value | df | Asymp. Sig. (2 sided) | Exact Sig. (2 sided) |
| Pearson Chi-Square | 19.574 | 10 | 0.034 | 0.026 |
| Likelihood Ratio | 19.317 | 10 | 0.036 | 0.069 |
| Fisher's Exact Test | 14.481 | | | 0.076 |
| Impact of advances in knowledge and technology | | | | |
| 22. impact on production processes | | | | |
| | Value | df | Asymp. Sig. (2 sided) | Exact Sig. (2 sided) |
| Pearson Chi-Square | 17.236 | 8 | 0.028 | 0.017 |
| Likelihood Ratio | 17.953 | 8 | 0.022 | 0.026 |
| Fisher's Exact Test | 16.038 | | | 0.020 |
| 23. impact on conservation and processing techniques | | | | |
| | Value | df | Asymp. Sig. (2 sided) | Exact Sig. (2 sided) |
| Pearson Chi-Square | 10.062 | 6 | 0.122 | 0.118 |
| Likelihood Ratio | 13.238 | 6 | 0.039 | 0.058 |
| Fisher's Exact Test | 10.090 | | | 0.083 |

Source: Drawn up by the authors

external (not directly fishing related) environmental impacts; development and effects of other marine activities (above all, non-fishing-related); distortions in the fisheries markets, both at local and international level; problems of a social nature, especially those related to matters of gender and generational continuity. The initial basic problem has been transformed into a series of problems regarding fisheries regulation [75], and consideration of the other aspects has focused on analysing governance problems in the framework of socioecological systems [3,76].

The complexity of the different aspects mentioned above and the heterogeneity of SSF in different countries underline the need for a study of specific cases, as a basis for theoretical advances in these matters [52,77]. Moreover, this heterogeneity makes it difficult and weakens the comparison in quantitative terms, so it is advisable to include qualitative aspects and information to adequately assess the problems.

This paper includes some of these aspects for the case of SSF in Galicia. In this case, the questionnaires carried out allow us to see the direction and degree of intensity with which the problems are currently perceived. Additional qualitative information, partly collected in the questionnaires themselves, helps to complete the assessment and comparison with other case studies.

The responses also give a clue as to the degree or relevance of the possible influence of fishers in the different aspects contemplated. In particular, it can be observed that: i) they closely identify with SSF activities (and with its more conservationist nature) and assume the collective fishing rights (as historical rights); ii) they are calling for more presence of their own in management responsibilities and a more appropriate adjustment to their own reality (some specific comments estimate that the EU generalises in excess or that some technical measures are impossible to adopt at this time).

With respect to the general position on the different aspects, and despite not citing full "satisfaction" with the situation of the resources, it can be perceived that there is not a (total) rejection of the adequacy of current regulations. In general, the opinions pertaining to the section on regulation show a higher degree of divergence than in other aspects or sections. Indeed, there is a higher degree of unanimity in the evaluations regarding the effects of technological advances, climate change, distortions in the markets or social problems in the sector.

Accordingly, the relative optimism relating to the effects of the regulatory framework reflected in the FAO's evaluations [1] highlighted in the introduction does not appear to be fully shared by these users. However, there is not an outright rejection of the principles of justice and sustainability that underpin the basic jurisdictional agreements, rather criticism of specific applications and measures or dissatisfaction in relation with their own perspectives.

### 5.2. Where do the main concerns lie?

The situation of rights of access and use does not appear to be a main concern, but neither does regulation merit a clear recognition of success and achievement. In particular, some measures are evaluated negatively (by the majority, but not by all, as can be deduced from the frequency ratios in the responses and in the standard deviation). This is the case of the control systems or the policy on discards (which they see as instruments devised for larger fleets, but inadequate in SSF). In general, they frame the situation in a context of marginalisation insofar as European institutions are concerned.

Regulation of the markets is perceived to be an important and unresolved issue. However, although there is a perception of unease and vulnerability with regard to market trends, the direct focal points of potential conflict do not clearly emerge. Scientific and technical advances, on the other hand, are perceived as positive influences, with little or no concern for possible destabilising effects or risks.

The environmental situation is a cause for concern, although in the short term, the problems of water quality, control and treatment of waste and fuel spills are more identified (with the Prestige disaster in 2002 in Galician waters still fresh in people's minds, [78]). The impacts of climate change are also a great concern, but they are perceived in a not- immediate time horizon.

Some social aspects, in particular those relating to gender and generational renovation, are perceived as important, but at different stages of development. Whereas, with regard to gender, there have been significant changes this century so far, in relation with the incorporation of young people, there is no clear evidence of effective incentives to expand and improve their presence in the activity. This occurs, specifically, regarding training, pay and living conditions.

In any case, some differences can also be observed in gender-related questions, and it can be clearly seen that where women play a role in governing bodies and are more prominent is also the sector in which their presence in the labour market is higher (shellfishing), whereas progress is slower in the other activities.

These results could be in line with other observations in specialised literature [70]. This is shown, in particular, in the tendency to perceive the physical and technical human aspects or assets of their position positively. Also in the willingness (and ability) to participate in management functions and adaptation to changes and opportunities [24,44,46,48,57]. The coincidence is also observed in a more critical line of perception of political action (not always in line with the reality of the SSF and its own casuistry) [13,41,70].

But, in any case, the responses given also reflect a greater specificity in these political and institutional aspects and the confirmation that they accept the importance of the questions on the institutional agenda that we mention in Section 2.3 (role of SSF; participation and effects on efficiency; importance of ecosystem-based management [4,23,53,54,56]. In general, the comments themselves reflected in the qualitative part of the surveys refer to these aspects and to the closest reality and experience. On the other hand, they do not make room for a direct and unequivocal association with other aspects mentioned specifically for SSF in Section 2, such as references to the impacts of climate change or technological advances, or the specific casuistry of Blue Growth.

### 5.3. Perception of the effects of globalisation and business trends

The questionnaire enables us to be somewhat more precise in the specific questions relating to the effects of globalisation and new market trends. SSF fishers establish their business relations above all with retailers or business agents who are present at the first sale (in the auction process at the port/fish market). However, these agents are seen to be a group with less significant weight than others such as the large chains, wholesale distributors (who participate in Spain's central market or in international markets), or processing companies (canning and processed products). On the other hand, neither are SSF fisher's associations and organisations, or, to a lesser extent, other fishing companies, perceived to be economic agents that are flourishing, rather groups whose importance is diminishing. These evaluations appear to be in line with the observations on market trends in studies relating to developed countries [4,25–28,32].

With regard to the market's leading products, the responses do not enable us to establish clear priorities or significant increases in relative importance, and they appear to indicate positive possibilities and opportunities for the different lines of business that are the subject of the questions. Nonetheless, there are small differences in the intensity and the degree of consensus: eco-labelled and PDO products, as well as ready-made and semi-processed products, are perceived to be on the increase by all of the segments that we have established among those surveyed, who also include preserved products in this group. Unanimity is lower with regard to products presented more traditionally (fresh or frozen), as we will explain later.

### 5.4. Differences by segments

We can also separate the responses according to the different sub-

groups to which those surveyed belong. The responses in each case would also seem to accentuate aspects that correspond to the everyday reality of each group. In this way, although the perceptions of the different segments surveyed coincide to some extent, some specific details can also be detected by groups.

In the segment corresponding to the representatives of the CFs, we would highlight that: they perceive SSF to be more neglected; ii) they are more critical of measures such as the regulation of markets or discards (in line with the FLAGs, but not to the same extent with the MPAs); iii) they give more importance to first-sale buyers; iv) they better visualise the importance of fresh products.

In the segment corresponding to the representatives of MPAs, we would underline that: i) they usually display more neutral positions with regard to measures that specifically affect fishing, such as the control measures, ecosystem-based regulation, the participation of fishers or measures affecting discards (with a significant dispersion of opinions in this case: the high values of standard deviation in these items appears to be compatible with this); ii) they are less sensitive or more indifferent to matters of gender; iii) they magnify the importance of canning companies and preserved products (in comparison with other segments), and also of semi-processed products (in line with the FLAGs in this aspect).

With regard to the representatives of the FLAGs: i) they are more optimistic towards conservation measures (ecosystem-based regulation, requirement levels…); ii) they show more concern for (or value more highly the importance of) market trends (responses related to the adequacy of regulatory measures, the importance of the large companies and distributors, of the new product lines and of traceability); iii) they show themselves to be quite sensitive to social matters.

## 6. Conclusion

This paper provides additional knowledge on small-scale fisheries and, more significantly, on the characteristics and dynamics of the fisheries sector in a region (Galicia) traditionally linked to maritime activities. This contribution focuses on the analysis of the perceptions of fishery sector agents in order to identify and ponder concerns and sensitivities regarding aspects that have been defined as relevant in previous studies on small-scale fishery dynamics. Furthermore, given the diversity of economic and institutional processes and situations in the area under study, it can be seen that these sensitivities can change in accordance with such diversity.

In this sense, the results of the study make it possible to show the perceptions of the SSF agents in Galicia and their intensity, as well as to appreciate coincidences or similarities with the findings of other studies, particularly with the FAO reports. However, it is also possible to highlight some gaps left by the FAO evaluations (which focus directly on their own objectives and, therefore, on regulatory measures). Thus, the effects of globalisation, changes in institutional conditions, or impacts on technological or environmental aspects are evaluated and relativised insofar as they can condition perceptions as a whole. This assessment also takes into account information on qualitative aspects, given the heterogeneity observed between the different case studies. Future lines of research, such as a temporal and dynamic comparison of how perceptions of the fisheries sector change over time, or a global comparison of whether perceptions of global issues change in different geographical areas, could be also interesting.

The aim of the study has been to contrast the perception of aspects related to initiatives of direct action in fisheries regulation (general initiatives and some specific action) and, simultaneously, aspects related to global and external dynamics of an economic or social nature (globalisation, climate change, gender and generational matters). The results show that both global movements as well as local dynamics are present in the perceptions of agents (and probably in their strategies), which would condition the effectiveness of regulatory initiatives, conceived on scientific bases, but which have to be applied in diverse socioecological contexts. In this sense, the consideration of social agendas, forms and levels of participation, the importance of questions surrounding gender and opportunities for the new generations, or the particular environmental conditions in each scenario, could facilitate more efficient action with greater involvement on the part of agents in the different cases of application.

Along these lines, this study joins other case studies in helping address fishery governance and management matters (including the theoretical developments in this field of know-how) with more knowledge and rigour. Also, in the final instance, the very institutional regulatory initiatives (those of the FAO or the United Nations, for example) which are currently helping to harmonise and improve the SDGs' perspectives.

With respect to the case study specifically, a tendency to positively perceive technological advances (regardless of whether possible imbalances deriving from their rapid implementation might emerge), and social aspects (questions regarding gender, participation or generational matters) is appreciated. Instead, there is concern and critical attitudes towards political and institutional actions which impact more directly on everyday maritime fishery activity, with special emphasis on the insufficient adequacy of regulations in respect of SSF. This more short-term perspective contrasts with the more long-term and general perception regarding environmental problems (climate change) or market regulation problems (distortions related to greater internationalisation and competition, and to the unequal power of certain agents in this scenario).

## Credit authorship contribution statement

All the work in this document, as well as the revision, has been carried out jointly by the 4 authors.

## Data Availability

The data that has been used is confidential.

## Acknowledgements

The study was financed by the Xunta de Galicia's Regional, the Spanish Ministry for Science and Innovation and the FEDER (projects ED431C2018/48 and RTI2018–099225-B-100). I.G.L. was also funded by the European Union (NextGenerationEU / Spanish Recovery, Transformation and Resilience Plan / University of Vigo, grant ref.585507).

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2023.105530.

## References

[1] FAO. The State of World Fisheries and Aquaculture 2020, In brief. Sustainability in action, FAO, Rome, 2020. https://doi.org/10.4060/ca9231en.
[2] FAO, Checklist and Technical Guidelines to Combat Ilegal, Unreported and Unregulated (IUU) Fishing, FAO, Rome, 2021, https://doi.org/10.4060/cb6186.en. https://doi.org/10.4060/cb5992.en.
[3] X. Basurto, S. Gelcich, E. Ostrom, The socio-ecological system framework as a knowledge classificatory system for benthic small-scale fisheries, Glob. Environ. Change 23 (2023) (2013) 1366–1380, https://doi.org/10.1016/j.gloenvcha.2013.08.001.
[4] J. LLoret, I.G. Cox, H. Cabral, M. Castro, T. Font, J.M.S. Gonçalves, A. Gordoa, E. Hoefnagel, S. Matic-Skoko, E. Mikkelsen, B. Morales-Nin, D.K. Moutopoulos, M. Muñoz, M. Neves dos Santos, P. Pintassilgo, C. Pita, K.I. Stergiou, V. Ünal, P. Veiga, Small-scale coastal fisheries in European Seas are not what they were: Ecological, social and econopmic changes, Mar. Policy 98 (2018) (2016) 176–186, https://doi.org/10.1016/j.marpol.2016.11.007.
[5] European Commission (2009), Green paper. Reform of the Common Fisheries Policy. Brussels, 22.4.2009, COM (2009)163 final, ⟨https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0163:FIN:EN:PDF⟩.
[6] European Commission (2011), Proposal for a regulation of the European Parliament and of the Council on the Common Fisheries Policy, Brussels 13.7.2011,

COM (2011), 425 final, ⟨https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0425:FIN:EN:PDF⟩.
[7] United Nations (2015), Resolution adopted by the General Assembly on 25 September 2015, 70/1. Transforming our world: the 2030 Agenda for Sustainable Development, A/RES/70/1, ⟨https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E⟩.
[8] FAO, Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication, ISBN 978-92-5-108704-6, Roma, 2015.
[9] R.L. Singleton, E.H. Allison, P. Le Billon, U.R. Sumaila, Conservation and the right to fish: International conservation NGOs and the implementation of the voluntary guidelines for securing sustainable small-scale fisheries, Mar. Policy 84 (2017) (2017) 22–32, https://doi.org/10.1016/j.marpol.2017.06.026.
[10] U.R. Sumaila, W.L. Cheung, V.W. Lam, D. Pauly, S. Herrick, Climate change impacts on the biophysics and economics of world fisheries, Nat. Clim. Change 1 (2011) 449–456, https://doi.org/10.1038/nclimate1301.
[11] V. Lam, W.I. Cheung, G. Reygondeau, R. Sumaila, Projected change in global fisheries revenues under climate change, Sci. Rep. 6 (2016) 32607, https://doi.org/10.1038/srep32607.
[12] D. Salgueiro-Otero, E. Ojea, A better understanding of social-ecological systems is needed for adapting fisheries to climate change, Mar. Policy 122 (2020) (2020), 104123, https://doi.org/10.1016/J.marpol.2020.104123.
[13] B.I. Haugen, L.A. Cramer, G.G. Waldbusser, F.D.L. Conway, Resilience and adaptative capacity of Oregońs fishing community: Cumulative impacts of climate change and the graying of de fleet, Mar. Policy 126 (2021) (2021), 104424, https://doi.org/10.1016/J.marpol.2021.104424.
[14] A. Schuhbauer, R. Chuenpagdee, W.L. Cheung, K. Greer, U.R. Sumaila, How subsidies affect the economic viabilityof small-scale fisheries, Mar. Policy 82 (2017) (2017) 114–121, https://doi.org/10.1016/j.marpol.2017.11.05.013.
[15] U.R. Sumaila, N. Ebrahim, A. Schubauer, D. Skerrit, Y. Li, H.S. Kim, T.G. Mallory, V.W.L. Lam, D. Pauly, Updated estimates and analysis of global fisheries subsidies, Mar. Policy 109 (2019) (2019), 103695, https://doi.org/10.1016/J.marpol.2019.103695.
[16] European Commission (2006a), Towards a future Maritime Policy for the Union: A European Vision for the Oceans and Seas, COM (2006) 275 final.
[17] European Commission (2006b), Commission Staff Working Document. Annexes to the Green Paper "Towards a future Maritime Policy for the Union: A European Vision for the Oceans and Seas", SEC (2006) 689.
[18] European Commission (2008), Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive).
[19] European Commission (2017), Commission Staff Working Document SWD(2017) 128 final. Report on the Blue Growth Strategy: Towards More Sustainable Growth and Jobs in the Blue Economy, ⟨https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/swd-2017–128.en.pdf⟩.
[20] A.M. Eikeset, A.B. Mazzarella, B. Davíosdóttir, D.H. Klinger, S.A. Levin, E. Rovenskaya, N.C. Stenseth, What is blue growth? The semantics os "Sustainable Development" of marine environments, Mar. Policy 87 (2018) (2018) 177–179, https://doi.org/10.1016/j.marpol.2017.10.019.
[21] D. Pauly, A vision for marine fisheries in a global blue economy, Mar. Policy 87 (2017) 371–374, https://doi.org/10.1016/j.marpol.2017.11.05.013.
[22] W. Rickels, C. Weigand, P. Grasse, J. Schmidt, R. Voss, Does the European Union achieve comprehensive blue growth? Progress of EU coastal states in the Baltic and North Sea, and the Atlantic Ocean against sustainable development goal 14, Mar. Policy 106 (2019) (2019), https://doi.org/10.1016/J.marpol.2018.103515.
[23] N.J. Bennett, J. Blythe, C.S. White, C. Campero, Blue Growth and blue justice: ten risks and solutions for the ocean economy, Mar. Policy 125 (2021) (2021), 104387, https://doi.org/10.1016/J.marpol.2020.1043687.
[24] Ma. Dolores Garza-Gil, Varela-Lafuente, M. Manuel, Marcos I. Pérez-Pérez, The blue economy in the european union: valuation of spanish small-scale fishersperceptions on environmental and socioeconomic effects, Panoeconomicus 68 (4) (2021) 461–481, https://doi.org/10.2298/PAN180425013G.
[25] B.I. Crona, X. Basurto, D. Squires, S. Gelcich, T.M. Daw, A. Khan, E. Havice, V. Chomo, M. Troell, E.A. Buchary, E.H. Allison, Towards atypology of interaccions between small-scale fisheries and global seafood trade, Mar. Policy 65 (2016) (2016) 1–10, https://doi.org/10.1016/j.marpol.2015.11.016.
[26] S. Nadarajah, O. Flaaten, Global aquaculture growth and institutional quality, Mar. Policy 84 (2017) (2017) 142–151, https://doi.org/10.1016/j.marpol.2017.07.018.
[27] H. Österblom, J.-B. Jouffray, C. Folke, B. Crona, M. Troell, A. Merrie, Rockström, Transnational corporations as "keystone actors" in marine ecosystems, PLoS ONE 10 (5) (2015), e0127533, https://doi.org/10.1371/jounal.pone.0127533.
[28] B.I. Crona, T. Van Holt, M. Peterson, T.M. Dw, E. Buchary, Using social-ecological síndromes to understand impacts of international seafood trade on small-scale fisheries, Glob. Environ. Change 35 (2015) 162–175.
[29] R. Pomeroy, C. Arango, C.G. Lomboy, S. Box, Financial inclusion to build economic resilience in small-scale fisheries, Mar. Policy 118 (2020) (2020), 103982, https://doi.org/10.1016/J.marpol.2020.103982.
[30] P. Prosperi, J. Kirwan, D. Maye, F. Bartolini, D. Vergamini, G. Brunori, Adaptation strategies of small-scale fisheries within changing market and regulatory conditions in the EU, Mar. Policy 100 (2019) 316–323, https://doi.org/10.1016/J.marpol.2018.12.006.
[31] C.C. Wabnitz, R. Blasiak, The rapidly changing world of ocean finance, Mar. Policy 107 (2019) (2019), 103526, https://doi.org/10.1016/J.marpol.2019.103526.
[32] J. Penca, A. Said, M. Cavallé, C. Pita, S. Libralato, Sustainable small-scale fisheries markets in the Mediterranean: weakness and opportunities, Marit. Stud. 2021 (20) (2021) 141–155, https://doi.org/10.1007/s40152-021-00222-5.
[33] A.T. Gutierrez, S.K. Morgan, The influence of the sustainable seafood movement in the US and UK capture fisheries supply chain and fisheries governance, Front. Mar. Sci. 2 (2015) 72, https://doi.org/10.3389/fmars.2015.00072.
[34] J. Penca, Mainstreaming sustainable consumption of seafood though enhanced mandatory food labeling, Front. Mar. Sci. (2020), https://doi.org/10.3389/fmars.2020.598682.
[35] European Commission (2008), Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control, ELI: ⟨http://data.europa.eu/eli/reg/2008/889/oj⟩.
[36] European Commission (2010), Commission Regulation (EU) No 271/2010 of 24 March 2010 amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards the organic production logo of the European Union.
[37] FAO (2011), Technical guidelines on aquaculture certification, Roma 2011, ISBN: 978–92-5- 006912–8; ⟨https://www.fao.org/3/i2296t/i2296t.pdf⟩.
[38] OESA-FUNDACIÓN BIODIVERSIDAD (2017), Certificaciones, estándares y marcas de interés para el sector acuícola español, Fundación Biodiversidad, Madrid, ⟨https://observatorio-acuicultura.es/sites/default/files/images/adjuntos/libros/certificaciones_acuicultura.pdf⟩.
[39] FAO (2021), FAO yearbook. Fishery and Aquaculture Statistics 2019/FAO annuaire. Rome/Roma. https://doi.org/10.4060/cb7874t.
[40] FAO, The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation, FAO, Rome, 2022, https://doi.org/10.4060/cc0461en. ISBN 978-92-5-136364-5.
[41] C. Pita, J.J. Pascual-Fernández, M. Bavinck, Small-Scale Fisheries in Europe: Challenges and opportunities, in: J.J. Pascual-Fernández, C. Pita, M. Bavinck (Eds.), Small-Scale Fisheries in Europe: Status, Resilience and Governance, Mare Pubs. Series 23, Springer Nature Switzerland AG, 2020, https://doi.org/10.1007/978-3-030-37371-9.
[42] C. Veiga, C. Pita, M. Rangel, J.M.S. Gonçalves, A. Campos, P.G. Fernandes, A. Sala, M. Virgili, A. Lucchetti, J. Brcic, S. Villasante, M.A. Ballesteros, R. Chapela, J. L. Santiago, S. Agnarsson, Ó. Ögmundarson, K. Erzini, The EU landing obligation and European small-scale fisheries: what are the odds for success, Mar. Policy 64 (2016) (2016) 64–71, https://doi.org/10.1016/J.marpol.2015.11.008.
[43] D. Soto-Oñate, A.C. Lemos-Nobre, The European Union Landing obligation: the compliance problems derived from its multilevel approach, Mar. Policy 132 (2021) (2021), 104666, https://doi.org/10.1016/J.marpol.2021.104666.
[44] S. Wongbusarakum, M. Gorstein, R. Pomeroy, C. Anderson, A. Mawyer, Mobilizing for change: assessing social adaptative capacity in Micronesian fishing communities, Mar. Policy 129 (2021) (2021), 104508, https://doi.org/10.1016/J.marpol.2021.104508.
[45] Kushardanto, et al., Household finances and trust are key determinants of benefits from small-scale fisheries co-management, Mar. Policy 145 (2022) (2022), 105284, https://doi.org/10.1016/j.marpol.2022.105284.
[46] K. Frangoudes, B. Marugán-Pintos, J.J. Pascual-Fernández, From open Access to co-vernance and conservation: The case of women shellfish collectors in Galicia (Spain), Mar. Policy 32 (2008) (2008) 223–232, https://doi.org/10.1016/j.marpol.2007.09.007.
[47] d Kleiber, L.-M.- Harris, A.C.J. Vincent, Gender and small-scale fisheries: a case gor counting womwn and beyond, Fish Fish 2015 (16) (2015) 547–562, https://doi.org/10.1111/faf.12075.
[48] J. Tam, K.M.A. Chan, T. Satterfield, G.G. Sing, S. Gelcich, Gone fishing? Intergenerational cultural shifts can undermine common property co-managed fisheries, Mar. Policy 90 (2018) (2018) 1–5, https://doi.org/10.1016/J.marpol.2018.01.025.
[49] E. Alonso-Población, S.V. Siar, Women's Participation and Leadership in Fisherfolk Organizations and Collective Action in Fisheries: a Review of Evidence on Enablers, Drivers and Barriers. FAO fisheries and aquaculture, circular No.1159, FAO, Rome, 2018. ISBN 978-92-5-130245-3.
[50] M.A.M. Karper, P.F.M. Lopes, Punishment and compliance: exploring scenarios to improve the legitimacy of small-scale fisheries management rules on the Brazilian coast, Mar. Policy 44 (2014) (2014) 457–464, https://doi.org/10.1016/j.marpol.2013.10.012.
[51] Garcia-Lozano, et al., Decent work in fisheries: current trends and key considerations for future, research and policy, Mar. Policy 136 (2022) (2022), 104922, https://doi.org/10.1016/j.marpol.2021.104922.
[52] J. Nakamura, R. Chuenpagdee, M. El Halimi, Unpacking legal and policy frameworks: a step ahead for implementing the small-scale fisheries guidelines, Mar. Policy 129 (2021) (2021), 104568, https://doi.org/10.1016/J.marpol.2021.104568.
[53] M. Schlüter, E. Lindkvist, X. Basurto, The interplay between top-down interventions and bopttom-up self-organizations shapes opportunities for transforming self-governance in small-scale fisheries, Mar. Policy 128 (2021) (2021), 104485, https://doi.org/10.1016/J.marpol.2021.104485.
[54] E. Schuch, S. Gabbert, A.P. Richter, Institutional inertia in European fisheries-insights from the Etlantic horse mackerel case, Mar. Policy 128 (2021) (2021), 104464, https://doi.org/10.1016/J.marpol.2021.104464.
[55] S. Partelow, T. Seara, R.B. Pollnac, V. Ruiz, Job satisfaction in small-scale fisheries: comparing differences between Costa Rica, Puerto Rico and the Dominican Republic, Mar. Policy 117 (2020) (2020), 103949, https://doi.org/10.1016/j.marpol.2020.103949.

[56] M. Cucuzza, S. Stoll, H. Leslie, Evaluating the theoretical and practical linkages between ecisystem-based fisheries management and fisheries co-management, Mar. Policy 126 (2021) (2021), 104390, https://doi.org/10.1016/J.marpol.2020.104390.
[57] I. García-Lorenzo, M.M. Varela-Lafuente, D. Garza-Gil, Adaptative processes in small-scale traditional fishermen's organisations. the case of Cofradías in Galicia (NWSpain), Mar. Policy 99 (2019) 382–390, https://doi.org/10.1016/j.marpol.2018.10.041.
[58] J.C. Surís-Regueiro, J.L. Santiago, Characterization of fisheries dependence in Galicia (Spain), Mar. Policy 47 (2014) 99–109, https://doi.org/10.1016/j.marpol.2014.02.006.
[59] Pérez-Pérez, M., Torralba-Cano, J., Varela-Lafuente, M. (2008), Las pesquerías gallegas en un contexto integrado y global, in F. G. Laxe (ed.), Lecciones de Economía Pesquera. Ed. Netbiblo, A Coruña. ISBN: 978–84-9745–392-9.
[60] G. Caballero, M.D. Garza-Gil, M.M. Varela-Lafuente, The institutional foundations of economic performance of mussel production: The Spanish case of the Galician floating raft culture, Mar. Policy 33 (2009) 288–296, https://doi.org/10.1016/j.marpol.2008.07.008.
[61] U. Labarta, M.J. Fernández-Reiriz, The Galician mussel industry: Innovation and changes in the last forty years, Ocean Coast. Manag. 167 (2019) 208–218, https://doi.org/10.1016/j.ocecoaman.2018.10.012.
[62] G. Rodríguez-Rodríguez, S. Villasante, M.C. García-Negro, Are red tides affecting economically the commercialization of the Galician (NW Spain) mussel farming, Mar. Policy 35 (2011) 252–257, https://doi.org/10.1016/j.marpol.2010.08.008.
[63] Xunta de Galicia, 2021. Registro de Buques Pesqueros de la Comunidad Autónoma de Galicia – Data from October 13, 2021: ⟨https://www.pescadegalicia.gal/rexbuque/⟩. (Accessed 13/10/2021).
[64] J.M. Sobrino-Heredia, G.A. Oanta, The legal impact of the common fisheries policy on the Galician fisheries sector, Ocean Coast. Manag. 167 (2019) 87–99, https://doi.org/10.1016/j.ocecoaman.2018.10.011.
[65] I. García-Lorenzo, M.J. Cabaleiro-Casal, M.M. Varela-Lafuente, Fishermeńs associations of the small-scale fisheries: study applied to the participation in Cofradías of Galicia (MW Spain), Ocean Coast. Manag. 178 (2019), 104841, https://doi.org/10.1016/j.ocecoaman.2019.104841.
[66] L. Miret-Pastor, K. Svels, R. Freeman, Towards territorial development in fisheries areas: a typology of projects funded by fisheries local action groups, Mar. Policy 119 (2020), 104111, https://doi.org/10.1016/j.marpol.2020.104111.
[67] M.A. Piñeiro-Antelo, R. Lois-González, The role of European fisheries funds for innovation and regional development in Galicia (Spain), Eur. Plan. Stud. (2019) 27, https://doi.org/10.1080/09654313.2019.1635996.
[68] M.A. Piñeiro-Antelo, J. Felicidades-García, B. O'Keeffe, The FLAG scheme in the governance of EU coastal areas. the cases of Ireland and Galicia (Spain), Mar. Policy 122 (2020), 103424, https://doi.org/10.1016/j.marpol.2019.01.013.
[69] S. Gelcich, N. Godoy, J.C. Castilla, G. Edward-Jones, Artisanal fisherśperceptions regarding coastal co-management policies in Chile and their potentials to scale-up marine biodiversity conservation, Ocean Coast. Manag. 52 (2009) 424–432, https://doi.org/10.1016/j.ocecoaman.2009.07.005.
[70] N.J. Bennett, N.C. Ban, A. Schuhbauer, D.-V. Splichalova, M. Eadie, K. Vandeborne, J. McIsaac, E. Angel, J. Charleson, E. Gavenus, S. Harper, T. Satterfield, T. Sutcliffe, R. Sumaila, Access rights, capacities and benefits in small-scale fisheries: insights from the Pacific Coast of Canada, Mar. Policy 130 (2021) (2021), 104581, https://doi.org/10.1016/J.marpol.2021.104581.
[71] P. Kimani, A. Wamukota, J.O. Manyala, C.M. Mlewa, Actors' perceptions of government performance in support of value chain development in marine small-scale fisheries in Kenya, Mar. Policy 122 (2020) (2020), 104221, https://doi.org/10.1016/j.marpol.2020.104221.
[72] K.L. Cochrane, Complexity in fisheries and limitations in the increasing complexity of fisheries management, ICES J. Mar. Sci. 56 (6) (1999) 917–926, https://doi.org/10.1006/jmsc.1999.0539.
[73] V. Bewick, L. Cheek, J. Ball, Statistics review 8. Qualitative data tests of association, Crit. Care 8 (1) (2004) 46–53, https://doi.org/10.1186/cc2428.
[74] A.S. Hess, J.R. Hess, Understanding tests of the association of categorical variables: the Pearson chi-square test and Fisher's exact test, Transfusion 57 (4) (2017) 877–879, https://doi.org/10.1111/tfr.14057.
[75] T. Bjorndal, G. Munro, The Economics and Management of World Fisheries, Oxford University Press, Oxford, U.K., 2012, p. 2012 (ISBN: 978-0-19-957675).
[76] S. Jentoft, R. Chuenpagdee, Interactive governance for small-fisheries. Global Reflections. Centre for Maritime Research MARE, Springer Int. Pub., Switzerland, 2015.
[77] M.D. Mc Ginnis, E. Ostrom, Social-ecological system framework: initial changes and continuing challenges, Ecol. Soc. 19 (2) (2014) 1–30 (2014).
[78] M.D. Garza-Gil, A. Prada-Blanco, M.X. Vázquez-Rodríguez, Estimating the short-term economic damages from the prestige oil spill in the galician fisheries and tourism, Ecol. Econ. 58 (4) (2006) 842–849.