



Mainstreaming Sustainable Consumption of Seafood Through Enhanced Mandatory Food Labeling

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To contribute to the debate about sustainable seafood consumption, this article considers the role of mandatory food labeling. The article first flags the rise of a policy paradigm of shared responsibility and policy imperatives at various levels calling for increased integration of the citizen/consumer into public regimes, including in fisheries governance. It then explores the options available to citizen/consumers to engage in the fisheries regime in different stages of the value chain and evaluates their readiness to respond to the expectations. Mandatory food labeling of seafood is introduced as an under-unexplored governance tool, alongside the key enabling technological and policy trends. The rise of transparency and traceability, both as norms and a set of technological capabilities, is highlighted as an opportunity for implementation of mandatory seafood labeling. While recognizing equity challenges and various supplementary actions needed to ensure an effective behavioral and attitudinal shift toward more engaged governance (better education and enforcement and an enabling social setting), the article suggests to further explore mandatory labeling within the governance toolbox. It should be particularly relevant in the context of developed markets with global trade and political influence, and as means of fostering ocean literacy and transparent, participative and deliberative kind of governance.

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INTRODUCTION

The sustainability record of capture fisheries remains insufficient. The Sustainable Development Goals (SDG), in the indicator 14.4, mandate the governments to effectively regulate harvesting and end overfishing, illegal, unreported, and unregulated (IUU) fishing, and destructive fishing. It is estimated that the target is unlikely to be achieved within 2020 and that it will require more time and effort on the part of all stakeholders, including consumers, where progress is needed in transformation of their perceptions and in provision of transparent and timely information to the public (FAO, 2020: 54). A greater role of citizen/consumer in accomplishing sustainability targets is anticipated also elsewhere in SDGs (SDG 12 and 17). Across the board, a fundamental shift can be noted in the expectation of citizen/consumer involvement in the governance model. Sustainable consumption has moved from a voluntary domain and its dependency on the consumer's sensitivity to ethical issues or "willingness to pay" a price premium (Richter et al., 2017; Zander and Feucht, 2018; Hilger et al., 2019), to a more mainstream policy expectation, according to which all consumers should be animated to do good for the public regime. Against this policy expectation, too little clarity exists over *how* to effectively do so. Key questions remain unanswered: Are existing

policy tools adequately designed to engage the consumer to the desired extent? If not, how could they be improved?

This article contributes to the scholarship on sustainable consumption as part of sustainable governance in seafood (referring here to wild fishery, while acknowledging a heavy interaction with aquaculture products). The starting point is that consumer is a stakeholder in the “governance concert” of sustainable seafood (Barclay and Miller, 2018), but receiving insufficient attention in their influence on sustainable resource governance (Crona et al., 2015). Research has examined various instruments in that orchestration, ranging from the earliest sustainability campaigns and eco-certification or eco labeling (Iles, 2007; Jacquet and Pauly, 2007; Thrane et al., 2009) and more recent inventions of fishery improvement projects (FIPs), fishery credit systems, sustainability sourcing policies, and traceability schemes (Gutiérrez and Morgan, 2017; Kittinger et al., 2017; Bailey et al., 2018; Bush and Oosterveer, 2019). This body of literature is concerned with solutions to various sustainability challenges of the 21st century, including overfishing, social injustices, and unsustainable consumption patterns. One feature of this research is that it has focused on instruments devised by private actors, although recognizing their close interaction with government structures, and indeed mutual reinforcement between the two, within a model of hybrid governance (Gale and Haward, 2011; Bailey et al., 2016b; Bush et al., 2017). But while government is seen to play a role, that is understood as limited to hard regulation and providing supporting institutions and assurance for private governance to thrive. The tools that the governments can avail of to foster the consumer engagement have been sidelined. Nevertheless, public policy can do more to effectively engage this so-far neglected stakeholder in fisheries governance. Indeed, as trends enhancing the role of the citizen/consumer in global governance are on the rise, such instruments should be explored.

The aim of the article is to explore the potential of a core public policy tool, mandatory food labeling, to contribute to seafood sustainability. It asks: Can mandatory labeling play a role among adequate policy tools to respond to the emerging paradigm about the involvement of the consumer and under what conditions? The article defines the gap that exists between the policy targets related to sustainable consumption and the actual policy tools available to the consumer, but also advances the debate about how to overcome it. The research is based on an integrative review of existing theories and thinking from published literature, contextualized with key policy developments. Selected relevant literature from different traditions is assessed, critiqued, and synthesized in a way that enables the emergence of a new perspective on potential policy tools in a new policy context. Sources of policy developments are legal and political, including published strategies and public statements by policy and business actors. Through these, the piece details the inconsistencies between the policy paradigms and rhetoric, but also the emerging opportunities for progress toward a type of governance that provides workable tools for a responsible and empowered consumer.

The discussion in this paper is biased toward the consumers in developed countries and markets, noting that their governance frameworks, including enforcement and traceability mechanisms, and consumer awareness and organization, differ considerably from those in the developing countries. We examine the current EU mandatory labeling requirements and policy developments. The EU can serve as a case study of governance processes elsewhere, most notably North America and developed markets in the South. Furthermore, due to a high level of economic interdependency in seafood markets, these processes have a leverage to influence markets beyond their own. Large developed markets may also exert political influence, for instance, through bilateral and multilateral negotiations in international political processes. The EU is openly committed to acting as a sustainability leader in international ocean policy, including fisheries (European Commission, 2016), and to integrating sustainability concerns into its trade policy (European Commission, 2015). As such, the discussion about responsible consumption may at present be limited to some countries only, but it is a potential precursor for policy developments in other countries and in multilateral policies.

The article is structured as follows. Section “Governance Goals for Consumer Engagement” outlines the rationale for engaging the consumer in governance and reviews the expected role of the consumer in (capture) fisheries governance. Section “Commonly Examined Governance Tools for Sustainable Consumption and Their Weaknesses” reviews the typically discussed seafood governance tools in the context of their adequacy to respond to the identified policy expectations. Section “Mandatory Food Labeling as a Seafood Governance Tool” zooms onto the current application and the potential of mandatory seafood labeling in the context of recent normative trends and technological solutions. The article concludes by outlining the future of research work on consumer-targeting policy tools in the transition toward more sustainable consumption of fisheries governance.

GOVERNANCE GOALS FOR CONSUMER ENGAGEMENT

Across the policy domains, sustainable consumption is an ongoing governance challenge (Mont, 2019). This is no different in conservation and management of fisheries more specifically, although it might seem exotic in this context as the fisheries regime has been historically particularly insulated from the involvement of citizens and their concerns. The cornerstone of international fisheries law, the 1982 UN Law of the Sea Convention, put governments into center-stage. Since then, the governance focus has been on the cooperation among the governments on the one hand, and between governments and scientists on the other hand. Gradually, also fishermen and local resource users have begun being considered as sources of policy advice (Berkes, 2009) and fisheries management started to be conceptualized in terms of a system of interactions between state, market, and civil society groups (Kooiman and Bavinck, 2013). But even this differed from a wide engagement of consumers as

citizens in the conservation and management of fisheries that we are witnessing today.

The rising expectations of the consumers in global challenges have arisen as a result of a number of inter-related trends. At the heart stands an ever-increased material interdependence, fueled by globalization, which requires cooperation, rather than just co-existence. The notions of shared responsibility, concerted action, decentralization, and cooperation are central to global governance, even if they have been approached distinctly by various bodies of literature. For instance, international law has pointed to the changing role of states (Brunnée, 2008; Nollkaemper and Jacobs, 2013), supply chain management has alerted us to the rise of consumers and producers (Lenzen et al., 2007; Jacobs and Subramanian, 2012; Global Economic Forum, 2015), while scholarship in the context of natural resource management has advocated for theories of commons and highlighted the existence of polycentricity, interdependence, and collective action (Ostrom, 1990, 2010; Berkes, 2006). Adding to these developments in the information age is the rise of transparency (Mol, 2015). Jointly, much literature provides justification for integrating the consumers into the global resource exploitation, and advocates for it without necessarily measuring its impact.

A testimony to the relevance of these theories in practice was the adoption, in 2015, of SDGs with a strong focus on the consumers, despite their nature as primarily country-led and country-owned. Indicator 12.2 requests the sustainable management and efficient use of natural resource by all (including citizens) and SDG 12.8 expects that by 2030 people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature. Additionally, the SDG 17.14 expects policy coherence for sustainable development, and SDGs 17.16 and 17.17 encourage effective multi-stakeholder and multi-resource partnerships to support the achievement of the SDG in all countries. The SDGs are also formally communicated to individuals and couched in terms of advice to citizens (Sustainable Development Goals [SDG], 2019). It is important to recognize the SDGs as not only catering to the interests of the consumer, but also carving out a more visible role for him/her in the responsible management of resources.

A more consumer-focused governance approach started to appear in the fisheries management discourse. Some influence can be attributed to the adoption of the “blue growth” agenda, which loaded fisheries with expectations of technological development, added value to fish, and upgrading fish as commodity (Boonstra et al., 2018). The rise of policy objectives of “ocean literacy” and the understanding of the citizens’ scientific and educational potential also played a role (United Nations, 2018). Finally, an influential factor was also the framing of fisheries as part of a food system (Aksnes et al., 2017; Science Advice for Policy by European Academies [SAPEA], 2020), where citizens’ perceptions and expectations are seen as key drivers of sustainability (European Commission, 2020). Policy makers invented a more active role for consumers, as typified by the following statement: “Changing fish consumption is vital in helping fishing become more sustainable. As consumers and

market actors we have to be aware that what, when, and how we eat, buy, and sell seafood has a huge impact on this precious food source” (European Commission, 2018c). Policy makers want to create a more prominent role for the individual.

The policy makers’ effort is certainly also a response to the consumers’ interests. Apart from the concern for quality of the product, consumers have increased their awareness and susceptibility to the ethical issues implicated in global food trade. However, their expectations of accountability and stewardship of producers in the seafood have generally not been met. Consumers have been critical of the existing policy tools regarding sustainable seafood consumption (McClenachan et al., 2016). European consumers claim they are ready to make more sustainable food choices, but blame price, lack of information, and knowledge as top barriers (BEUC The European Consumer Organisation, 2020). The outbreak of the Covid-19 epidemic seems to be further reinforcing the sustainability-oriented attitudes by food consumers (Accenture, 2020; Hubbub, 2020). As sustainable consumption is becoming more of a norm, enabling it becomes a priority.

COMMONLY EXAMINED GOVERNANCE TOOLS FOR SUSTAINABLE CONSUMPTION AND THEIR WEAKNESSES

This section provides an overview of the types of mechanisms and approaches that account for the consumer and evaluates their ability to respond to the outlined policy goals. The survey of tools seeks to convey the conceptual frame rather than provide a complete listing of ongoing initiatives. The incredible range of initiatives, codes, and standards for sustainable seafood under constant development is difficult to capture, while their formats are more standard. I distinguish between two fundamental types of policy mechanism that factor the consumer into the resource management: supply-chain interventions (focusing on the business-to-business operation before a product reaches the consumer) and consumer-facing tools (focusing on the consumer’s leverage to affect the value chain). The concept of mandatory labeling fits under the latter, but it is singled out in a separate section of the article, to allow a more focused analysis.

Supply Chain Interventions

Supply chain interventions are invisible to the consumers, even if they are triggered by the concern for, and ultimately impact them. Indeed, influences over seafood supply chains take place in the backstage of the consumer’s decisions and affect the producers and intermediates in the seafood trade, but they originate from seafood buyers’ pressures for more sustainable sourcing. One example of such interventions is FIPs, which are tailored to the nature of the fishery (Cannon et al., 2018; Barr et al., 2019). Another one is more open-ended structural cooperation between fishers, processors, distributors, and retailers, such as Global Dialog on Seafood Traceability (GDST) and The Seafood Business for Ocean Stewardship (SeaBOS), which connect most

of the world's largest seafood production companies (SeaBOS and GDST, 2019). The results can be tangible: in February 2020, the GDST issued the first industry-led Standard for Interoperable Seafood Traceability Systems. The standard determines the data elements that need to be documented and transmitted within seafood supply chains, and protocols on how to share that data. The standardization of key elements of data across the industry would significantly facilitate traceability of seafood products and increase their verifiability.

Alongside the industry-led initiatives, governments are increasingly dedicated to citizens' concerns. The key issues are human rights and labor conditions in seafood value chains ranging over modern slavery, hazardous working conditions, lack of safety equipment, forced child labor, human trafficking, and others. In 2016, the governments had entrusted the FAO to develop the Draft Guidance on Social Responsibility in Fish and Aquaculture Value Chains. These were developed through a multiple stakeholder consultation and delivered in 2019, but have subsequently been put on hold in the FAO Committee on Fisheries Sub-Committee on Fish Trade. Allegedly, some countries oppose excessively obliging language, although the voluntary nature of the document is clearly stated (SeafoodSource, 2020). Despite the political reluctance of some countries, a level of commitment to socially responsible value chains by the majority of states should be noted.

Another area of governments' concern is IUU fishing. Governments are increasingly using trade measures to prevent of IUU-sourced fish from entering the international market or importing it. The EU, for instance, has sought to influence producers by establishing a mandatory catch system and advising States to improve the transparency of their markets in order to ensure traceability, although without requiring a full traceability (Van der Marel, 2019: 313). There seems to be little formal interaction between industry and government-led, voluntary and obligatory, activities in accomplishing sustainability targets. More coordination should be a priority given that the success of various seafood sustainability governance is dependent on the extent to which market initiatives interact with the relevant public law (Gutiérrez and Morgan, 2017).

Consumer-Facing Tools

While supply chain interventions only take note or acknowledge the consumers, governance tools that more directly *engage* the consumers are rather scarce. Sources of information that seafood consumers can consult in taking a decision to contribute to sustainability are not abundant. This is true for both the average, more passive, consumer and for the more sensitive and more aware consumer.

Generalized messages to consumers regarding seafood consumption are often a bad proxy. Consumers can be encouraged to rely on “freshness” or “localness” of seafood (European Commission, 2018c), but there are no systemic means of verifying those attributes. Advice given by fishmongers, retailers, or restaurants can be too subjective, or an inadequate simplification of scientific complexity in fish stocks or social complexity in value chains. Similarly, the invitation to consume less-popular, under-utilized species does not necessarily lead

to an overall positive outcome (Farmery et al., 2020). Finally, the consumer cannot also be expected to draw on scientific publications and stock assessment analyses, as these are too complex and inaccessible for most consumers.

Seafood campaigns, including consumer guides, seek to strike a balance between accessibility and rigor, but may end up urging for “sustainability” as a general notion and without the comprehensiveness, accuracy, and precision on specific products (Parkes et al., 2010). The majority of seafood guides (Marine Stewardship Council, 2018a; Mr.Goodfish, 2018; Slowfood, 2018; World Wide Fund for Nature, 2018) do also not feature detailed information on both ecological and social aspects of single value chains.

A valuable instrument for communicating the value chain directly to the consumer and a heavily debated governance tool is eco-labeling or third-party certification scheme. The strength of eco-labels lies in the fact that they communicate to the consumer in a simplified manner (through a label) the outcome of a prior rigorous assessment process applied to the value chain. The examples of eco-labels are Marine Stewardship Council (MSC), Dolphin-free label, Iceland Responsible Fisheries, Marine Eco-label Japan Fisheries Certification or Audubon G.U.L.F. (relating to fisheries from the Gulf of Mexico), and many others.¹ Eco-labeling schemes formulate their goal (their definition of sustainability) and then allow third-party entities to independently manage certification and assessment methodology. Third-party certification schemes rely on the power of demand (consumer preferences) on supply (the type of fish being fished and their fishing methods) (Deere, 1999; Roheim, 2008; Ward and Phillips, 2008). The assumption is that whenever a buyer chooses to purchase certified fish, certified fisheries are rewarded for their sustainable practices through that market preference, encouraging in turn more fisheries to undergo certification, and ultimately improving the stewardship of the world's oceans (Marine Stewardship Council, 2011).

The largest eco labeling scheme, MSC, is recognized for having improved the management and production capacities of many fisheries (Agnew et al., 2014), especially in absence of effective governmental regulation (e.g., Gulbrandsen, 2009). However, it has done little for setting an agreeable standard across the fishing industry. It is criticized for its various biases.

First, the acquisition of the MSC label is geographically highly unbalanced across the globe (Marine Stewardship Council, 2018b).² Developing countries and small-scale fishing enterprises are lagging behind in certification mainly due to the high fees involved (Pérez-Ramírez et al., 2012; Bush et al., 2013; Sampson et al., 2015; Duggan and Kochen, 2016; Wakamatsu and Wakamatsu, 2017). Second, the market penetration of the MSC labeling scheme is mostly limited to North American and North European countries. Even within the developed world,

¹The proliferation of eco-labels and campaigns has led to the creation of a form of meta-governance—the Global Sustainable Seafood Initiative (GSSI) Global Benchmark Tool—a reference framework, which benchmarks and provides recognition to reliable certification schemes.

²Currently, the two leading Food and Agriculture Organization (FAO) areas (FAO 27—North East Atlantic and FAO 21—North West Atlantic) have more certified fisheries than all the other areas combined (Marine Stewardship Council, 2018b).

certain European fishing industries (especially those from South Europe) with long history and wide variety of marketed seafood products demonstrate little interest for the MSC label (Salladarré et al., 2010). Third, the MSC's understanding of "sustainability" entirely disregards the social aspects and is thus exclusionary and monopolistic (Hadjimichael and Hegland, 2016). Fourth, the MSC has not so much reduced unsustainable consumption as it has implemented a new market of seemingly "sustainable" seafood products along the reinforcement of consumerism (Ponte, 2012; Akenji, 2014; Hadjimichael and Hegland, 2016). Fifth, the MSC's principles are believed to be too lenient and discretionary to be authoritative (Christian et al., 2013). Finally, the MSC is being challenged for its static interpretation of "sustainability" and for lacking incentives for fisheries' improvements once they are certified (Goyert et al., 2010; Bush et al., 2013).

While MSC, being the largest in size, attracts by far the most research, the fundamental lines of critique apply to other eco-labels in fisheries. They relate to legitimacy and credibility, mismatch between the requirements and realities, potential distortions to practices and livelihoods, equity and feasibility, and barriers to trade (Gardiner and Viswanathan, 2004). On the other hand, eco-labeling and voluntary standards are believed to contribute to some positive systemic impact (ISEAL Alliance, 2018). An evaluation, which is still ongoing, has revealed that they create an enabling environment, including the facilitation of a dialog among government, civil society, industry, and producers, as well as raise awareness among the consumers in a particular sector (*ibid.*).

Apart from the eco-labels, other initiatives exist to provide visibility to certain types of seafood products in the market, specially to differentiate the products by small-scale fishers. Initiatives have emerged in different parts of the world, and include novel approaches to re-organizing the supply chain at stages of branding, marketing, and selling the product, including creating own labels (Witter and Stoll, 2017; Penca, 2019; Duggan et al., 2020). Most of such initiatives are local and territory-embedded, even if capitalized on through an international network, such as Slowfood. These initiatives, however, are all deeply entrenched in transnational governance and production networks (Foley and Havice, 2016) and constitute a legitimate standard-setting practice, which recognizes individual seafood products and the production process behind them, comparable to the more globalized, technical standard-setting (Penca, 2019).

The ability of eco-labels and other market tools to communicate effectively with the consumer and to affect the market patterns are important qualities that could outbalance the weaknesses of any single eco-labeling scheme. A key question emerges: Is there a tool that taps into the strengths, while mainstreaming the choice over sustainable consumption?

MANDATORY FOOD LABELING AS A SEAFOOD GOVERNANCE TOOL

The potential role of mandatory food labeling rules in regulating seafood claims has been identified in the context of EU consumer law (Schebesta, 2016), but this tool is conspicuously absent from

the various overviews of governance instruments on sustainable seafood. This section reviews the premise of this governance tool and its application in the EU context as a case in point, and then proposes possible modifications in its design to increase the effectiveness, as well as the necessary subsidiary measures in the policy context.

The Rationale for Mandatory Food Labeling

Mandatory labeling is the visual output of a complex body of food information law that addresses multiple objectives, all of which focus on the consumer. Eco-labeling and mandatory labeling have commonalities and differences in their potential to advance sustainability in the context of seafood. They both focus on incentivization, rather than deterrence; combine prescriptive regulation with the potential of the market and rely on the power of information regarding a product. The difference between them is in the authority making the claim (International Organization for Standardization [IOS], 2012): while eco-labels are awarded to products or producers through an independent certification process conducted by a third-party private entity, mandatory labeling originates from public policy, where the regulator's requirements determine the kind of information to be provided on the product. Because it can be made compulsory, information contained within the food label is also more accessible to consumers and can have a broader outreach than eco-labeling.

Mandatory food labeling allows highlighting certain attributes of the product, without making a quality statement or judgment. This is particularly appropriate in the context of seafood, because sustainability can mean different things to different people (Bailey et al., 2018) and is measured by different indicators (Tlusty et al., 2012; Madin and Macreadie, 2015; McClenachan et al., 2016). It can be measured in terms of ecological impact, such as impact of fishing on related species or on ecosystems, animal welfare at harvest, carbon footprint of the product, as well as the socio-economic aspects, such as child labor, fair pay, and inclusion of women. Additionally, nutritional aspects also play an important role in individual's decisions. This renders seafood consumption an act with many possible combinations (Oken, 2012; Hallström, 2019). In such contexts, sufficient information offered on a product can facilitate individual prioritization of parameters, and allows different varieties for different consumers.

This has consequences for the way in which the consumer takes a decision. While eco-labeling informs or *tells* the consumer in a straightforward manner that a certain seafood product is "dolphin-free," "local," or "sustainable," mandatory labeling can ensure that relevant information is available to the consumer, who then decides on the implications and significance of that information. As such, mandatory labeling requires a higher level of consumer engagement with the information. If eco-labels act as a proxy for the consumer's understanding of the resource ecology or production process without requiring knowledge of it (Eden et al., 2008), mandatory labeling requires more background knowledge. In mandatory labeling, a certain level of knowledge investment is needed to allow each individual to assess the product's compliance or adherence with a selected goal. This

allows the consumers to make decisions that go beyond opting for “sustainable,” which may lack a clear meaning for the consumer (Cude, 1993; Thusty and Thorsen, 2016; Richter and Klöckner, 2017). **Supplementary Figure 1** illustrates one of the key differences between eco-labeling and mandatory food labeling.

From the systemic point of view, the primary concern of mandatory labeling is to ensure a level-playing field for the operation of a common market and the right of consumers to make informed choices regarding the product. The information included in a label results from several policy concerns. A food label can provide information on product use (e.g., storage instructions), health and safety (e.g., ingredients, health attributes of the product), provenance (e.g., geographic origin), and quality (e.g., nutritional information). But beyond informing the consumer of the qualities relating to health, a food label also allows the communication of ethical claims on broader policy concerns, such as protection of animal welfare or use of genetically modified products. As a result, mandatory labeling can convey key features of the product and its comparative advantage in relation to others, and enable the operation of an internal market, while encouraging dynamic, efficient, and innovative operators (European Commission, 2006). As a result, mandatory labeling ideally benefits both the consumer and the producer.

The crucial question—of concern in this piece—is over the extent to which mandatory labeling enacts new policy concerns. The inclusion of information on nutrition in many countries in 1990s in order to foster nutritionally appropriate food and healthier diets (Wartella et al., 2010) was one example of its adaptive nature. However, it is a rare one, as the legal mandate of mandatory food labeling to pursue “a high level of protection of consumers’ health and interests [...], with particular regard to health, economic, environmental, social and ethical considerations” (European Parliament, 2011), has historically developed almost exclusively as a tool of internal market and consumer policy (Purnhagen, 2013). Sustainability concerns have remained outside the scope of this tool.

In fisheries, sustainability concerns had been explicitly confined to the realm of voluntary instruments. When the EU embarked on the sustainability-driven reform of its Common Fisheries Policy (CFP), there was a strict division between narrow consumer concerns (to be captured by mandatory labeling) and ecological sustainability (to be reserved for voluntary eco-labeling) (European Parliament, 2013a,b). The proposition that a more empowering role of the consumer (European Parliament, 2016) was not needed was partly justified by the CFP’s (now missed) target to become entirely sustainable by 2020. Nevertheless, the EU strengthened the requirements for mandatory labeling of seafood, based on the reasoning that for the CFP to be a success “it is essential that consumers are informed, through (...) the importance of understanding the information contained on labels” (European Parliament, 2013a). This approach reflects some incoherency in the underlying logic, where the consumer should be informed on some aspects, but not those regarding sustainability. As the EU is becoming explicit about its commitment to empower consumers to make informed, healthy, and sustainable food choices through

mandatory labeling (European Commission, 2020), this provides a test for the political will to deploy mandatory labeling in seafood to that end.

Application of Rules and Their Evaluation

Rules on seafood labeling vary across jurisdictions and typically also contain different requirements for different types of products (fresh, prepared, preserved, processed, cooked, or canned) and for different species. The analysis of the application of this tool is thus inherently selective. We focus on the EU rules, which are believed to be at the forefront of requirements for labeling and have also served as a source of inspiration for non-EU countries (European Commission, 2018b), and the segment of fresh seafood product, which have the most comprehensive requirements.

The label of a fresh product in the EU must include the following elements: commercial designation and scientific names, fishing gear and catch area, information on whether the product has been defrosted, a “best before” date, and allergens. It must also contain information on its provenience; for fish caught in the Northeast Atlantic and Mediterranean and Black Seas, the label must display the name of the sub-area or division, along with a name that is easy for the consumer to understand, or present a map or pictogram; for fish caught in the rest of the world the label only needs to contain the name of the area. Other information can be provided, but it is not mandatory. **Supplementary Figure 2** provides a summary of the requirements.

The existing labeling scheme has some weaknesses from the point of view of the consumer’s demand for informed decisions and the objectives of the fishery policy. The EU’s internal evaluation found out that while the labeling requirements succeeded in achieving a high level of protection of human health and the functioning of the internal market, there is scope for improving the protection of consumer interests and in addressing the challenge of food sustainability and, in particular, food waste (European Commission, 2018b). Furthermore, the majority of consumers do not consult the label to gain insights into the sustainability of the product (Special Eurobarometer 450, 2017).

A key improvement would be to extend the transparency requirements to many more products than fresh and unprocessed, as currently required. The consumer should be able to get the same information when buying processed or canned products, and also in the processing part of the seafood supply chain, such as restaurants, canteens, schools, hospitals, etc. (D’Amico et al., 2016), especially as these are widespread means of consumption.

Further, a set of recommendations can be made regarding the selection of information. The date of the catch (or slaughter in the case of aquaculture) should be included among the requirements. The consumers have confirmed high relevance of this information (Special Eurobarometer 475, 2018). The date of catch seems more meaningful than the current requirement to state the “use by” date. Currently, the consumer is encouraged to buy “fresh” but lacks an objective tool to verify the product’s freshness without having access to this piece of information.

Next, consumers should have, and indeed have an interest (Special Eurobarometer 475, 2018) in knowing the flag and

port states of the vessel that caught the product, including the fisherman. Information about this already exists in the supply chain but it is not extended to the consumer. Currently, information about the port of landing is optional, while information about the flag state is not a requirement at all. This could be useful, given that different legal requirements apply for EU and non-EU vessels regarding labor standards, vessel safety, phytosanitary norms, and environmental measures—an issue that is considered as constituting inequality and unfair competition (European Parliament, 2018).

Another issue for the consumer in the current organization of information is its contextualization. The indication of commercial and scientific names (e.g., red mullet/*Mullus barbatus*), geographical sub-area (e.g., FAO 22), and fishing gear (e.g., gill net) mean very little *per se*, if the consumer does not have access to the context of that information. Such context is composed of data on the fish stock, fishing fleet exploiting it, and the applicable governing management approach. How can one know if Pacific cod is a more sustainable option than Atlantic cod (Miller et al., 2012)? Should one be careful about buying fish that is undersized or about buying it in a period that is suboptimal for maintaining viable population sizes; if so, what are references for making the right choice? Only access to an appropriate context allows the consumer to support a sustainable purchasing decision or engage with sustainability questions more broadly. It is true that effort has been made to deliver the technical information to a non-specialist target audience, for instance, in form of seafood databases containing information on populations and habitat impacts (FishWatch, 2018) or the stock assessment exercises available to the public (European Commission, 2018d). However, to the extent such information reaches an average consumer, it is currently provided for considerably fewer species than that found on the market and many of the stocks remain un-assessed.

It becomes clear that the list of potentially useful information becomes extensive and thus challenging for implementation. Even if the EU's requirements in principle require a certain level of market transparency, they fail to make this transparency serve the consumers—both average and educated, which is contrary to the objectives (European Commission, 2018a). A fundamental reform would be needed to accomplish a science-based, but also practical implementation that is informative for the consumer.

Scope for Improved Implementation

An improved mandatory seafood labeling should harness the trends and opportunities for implementation. The key among them are the rise of traceability, both as a norm and a set of technological capabilities facilitating the flow of information and connection among them.

Traceability as a quality is enabled by a system that transmits data in an accurate, timely, complete, and consistent way, and allows verification of the claims once they are made. Developing from its original purpose of responding to food safety and food quality concerns (FAO, 2017a), traceability is gaining traction in preventing, deterring, and eliminating IUU fishing (FAO, 2001; Hosch and Blaha, 2017). Besides that, traceability seeks to respond to conscientious consumers' demand to have access to reliable information about their products through all stages

of production and distribution, including verification of seafood fraud (Fiorino et al., 2018). For instance, tracking of the product's route could serve to consider the various intermediaries in seafood trading and the product's carbon footprint—a feature that is increasingly significant for any product, including seafood (Madin and Macreadie, 2015). Ultimately, it could also extend to the post-landing stage, where energy consumption, use of chemicals, waste handling, and wastewater emissions are important (Thrane et al., 2009). A simultaneous demand from both the consumers (for reasons of awareness) and the public authorities (for reasons of IUU and food safety) generates an opportunity for the establishment of comprehensive regulatory structures and systems with applicability in both consumer empowerment and the fisheries policy.

The development of reliable and verifiable traceability systems can be greatly facilitated by the advances in methods for both data collection and data transmission. Various geochemical, biochemical, and molecular methods enable reliable results about provenance of seafood products (Leal et al., 2015; Fiorino et al., 2018). Simultaneously, technologies, such as the internet of things, blockchain, and bar/QR coding are capable of considerably advancing the flow of information along the supply chain (Badia-Melis et al., 2015; Deloitte, 2017; Probst, 2019). Proliferating initiatives, such as *Fishcoin*, *TraSeable Solutions*, *Provanence*, and others, demonstrate the possibilities for cooperation between fishing industry and (blockchain) technology companies in making the journey of fish from “bait to plate” perfectly transparent and traceable (Blaha and Katafono, 2020).

To ensure full and effective traceability, the existence of powerful new technologies needs to go hand in hand with the development of standardized chain-of-custody process, determining data elements and storage protocols. In other words, an agreement is needed regarding what should be observable and how. A full traceability of products requires a substantial change with regard to the way fish trade is currently done, focusing on the ability to document a number of key attributes of the product or unit anywhere in the supply chain (Borit and Olsen, 2020). However, these requirements clash against the industrial actors and their demands for manageability of the entire food supply chain. The existing traceability requirements are already frustrating some fishermen as they reduce the storage space on boats and they prevent mixing fish from the same species caught in different areas (Ploeger, 2014). In that context, previously mentioned GDST Standard for interoperable seafood traceability represents a pioneering attempt in proposing a standard that is acceptable to the industry. It proposes to change the focus from batch identification to unit identification, and thus from using Lot Global Trade Item Number to Serial Global Trade Item Number as the new unit (Borit and Olsen, 2020). This proposal would essentially make each fish a lot more visible in the supply chain than it is now. It is hoped that this standard, rather than confirming an often adversarial nature of the food industry that prefers to operate with voluntary rather than mandatory labels (Kurzer and Cooper, 2012; Mayes, 2014), indicates a promising evolution in traceability across the sector.

The attempt to transform the sector is not without risks for equity. A particular group to pay attention to are small-scale fishers, who are the largest group in terms of employment and economic reliance, but operate with small vessels and very limited digital resources. A similar challenge is posed by data-poor fisheries, which may not have the sort of data required for assessment. This is not to present digital solutions and traceability opportunities as incompatible with small-scale or data-poor fisheries. Rather, it is to call for carefully designed solutions that integrate concerns of traceability with the policy process of empowering small-scale fisheries (Abalobi, 2019; Zelasney et al., 2020) and efforts for manageable but precautionary risk assessments (Dowling et al., 2019), and create synergies between policy goals. This remark is closely related to the need for traceability technologies and standards to be implemented not just in developed countries, but across the world's fisheries and world's markets. The seafood trade is too global to allow gray zones of non-compliance or significantly different standards of compliance (D'Amico et al., 2014; Bailey et al., 2016a). In that context, a level of regulatory approximation among different jurisdiction is certainly desirable. To contribute to progress, the traceability drive needs to close, rather than widen the existing equity-related gaps.

On the other end of the market, also the consumer is yet to benefit from the potential of digitalization. Here, the mode of delivery of information can be significantly enhanced. Rather than storied directly on the food product itself, information on various determinants of seafood sustainability could be accessible to consumer through a reference, such as a QR code or NFC tag attached to seafood products or packaging. Such remote information can facilitate access to the latest scientific findings and allow a more responsive consumer–market relationship. In many cases, a close and persistent engagement between stakeholders is a condition for spreading harvesting effort across a range or marine species and ultimately improving the status of fish stocks (Abalobi, 2019). A graphic representation of the digital possibilities in a labeling scheme is offered in **Supplementary Figure 3**.

One prominent example of a possible deployment of the use of state-of-the-art technology and stakeholder cooperation is the Global Record of Stocks and Fisheries (GRFS) database. It is essentially an inventory of global stocks and fisheries records. Data on fish stocks from multiple national and regional sources (even if guided by different standards) are processed to allow comparability. More precisely, the fishery records are compiled from the Fisheries and Resource Monitoring System (FIRMS, 2018) and FishSource (the program of the Sustainable Fisheries Partnership; FishSource, 2018), while stocks records are compiled from FIRMS, FishSource, and RAM Legacy Stock Assessment Database (RAM Legacy Stock Assessment Database, 2018). Constant updates on the data from independent, reliable, and authoritative sources are foreseen and provisions are made to integrate new information into the system. Stock and fisheries are linked by a unique IT and semantic identifier that allows tracing each product to its fishery and stock. The GRFS database has a great potential for supporting policy efforts to capitalize on traceability, serving both third-party (private) eco-labels

and public initiatives that target the consumer. It could be capitalized on by different countries, despite the differences in their implementation of traceability (Charlebois et al., 2014). A public pilot of this database will certainly generate important lessons on its large-scale feasibility. Overall, the technological capabilities seem to be less impeding than policy considerations to the success of seafood traceability.

Supporting Measures for Implementation

The goal of empowered citizen/consumer through enhanced labeling depends on several adjunct actions, none of which are without challenges. One is tackling the recurring and widespread problem of mis labeling or incomplete labeling (including misidentification), which heavily diminish the effectiveness of any labeling (Miller and Mariani, 2010; Miller et al., 2012; Helyar et al., 2014; Oceana, 2016; Esposito and Meloni, 2017). It is true that an increased number of stakeholders have strong interest in consistent respect of the rules that level the playing field: these are consumers, fishermen, retailers, and intermediaries seeking to add value to their products. Technological advancements in traceability play a significant role in allowing them to verify the claims and check the integrity of supply chains. However, they do not replace the continuous need for labor-intensive inspection and sanctioning. Enhanced governmental investment in monitoring and verification systems, and in non-compliance measures is essential (Wessells et al., 2001; Hosch and Blaha, 2017).

The next big challenge is getting the consumers to utilize the information effectively. Two types of challenges are highly relevant: is the consumer's tendency to become overloaded with information and prone to sub-optimal decisions (Mitchell et al., 2005) and a persistent knowledge-action gap (Owens, 2000; O'Brien, 2012). Behavioral sciences point to the fact that even if consumers possess the relevant information, they are subject to different cognitive capacities and behavioral biases. They suggest that regulation puts into center-stage a real-world, or average consumer, and his or her likelihood to perceive and process information, rather than an ideal or entirely rational consumer. Thus, traditional regulation (consisting of rules and information) is nowadays complemented by the measures to nudge the consumers into decisions (Alemanno, 2012; Lehner et al., 2016). Concrete proposals in the domain of seafood might encompass positioning more sustainable options of seafood products vis-à-vis others or suggesting the recommended portion size. A tempting means for simplifying the complexity of information would be to also introduce grade-like labeling system (using colors or letters to rank products). However, experiments with such approaches have offered mixed records at best (Hallstein and Villas-Boas, 2013; Hilger et al., 2019). However, in essence they fail to communicate the level of nuance in seafood that has been advocated for and is found in seafood value chains (various ecological and social factors). Additionally, in other contexts, grading-like schemes have been questioned for their ability to continuously push for progress both on the side of consumers and producers (Arditi et al., 2013).

Moreover, sustainable seafood consumption should increasingly be viewed from a societal point of view. The

insights from social practice theory refuse to look at sustainable consumption as an individualized action and highlight the material and social structures of consumption. They argue that consumption is not only a result of individual, isolated consumption choices, but also of societal norms, shared practices, conventions, and institutions (Heiskanen and Laakso, 2019). In the context of seafood, this proposition creates scope for reconfiguring people's expectations around what species to eat (e.g., transforming notions of "high-value species") and the social meaning of eating seafood.

A most obvious recommendation flowing from these findings is to support heavy awareness-raising activities in order to develop people's competencies to have a more active role in fisheries sustainability. Indeed, it has been proven that the consumers' understanding of the purpose of food labeling and the state of global fisheries significantly improves the chances of its success (Cowburn and Stockley, 2005; Uchida et al., 2014). In the case of mandatory labeling, the consumers' knowledge on the meaning of each element of the label, and on the socio-economic and ecological context of fisheries would need to become a priority.

These assignments also constitute opportunities. While effectiveness of mandatory labeling is conditioned upon education and awareness raising, it also fuels societal knowledge. The conceptual suggestion is to recognize the value of information on the label as both informative (providing consumers with the information they seek) and communicative (indicating to consumers that certain information is important). In the context of seafood eco-labels, it was found that consumer familiarity with these labels stimulates more pro-environmental seafood consumption (Jonell, 2016). Well-designed seafood policy tools can, and indeed should, activate the role not only of consumers in dynamic sustainable markets, but also of environmentally-conscious citizens and as concrete means to serve the promotion of ocean literacy (Jacquet et al., 2010; Gutierrez and Thornton, 2014; Tlusty and Thorsen, 2016). Building on the concept of "citizen science" (Irwin, 2002; Bonney et al., 2009; Silvertown, 2009), there is scope to explore how the citizen/consumer's use of information in the seafood markets can respond to enhanced monitoring of a regime and improved implementation tools, as urged for by both the international regime on fisheries (FAO, 2015, 2017b) and decent labor (International Labour Organization [ILO], 2007).

CONCLUSION

This article has argued for an enhanced citizen/consumer perspective in seafood consumption and governance in the context of policy imperatives. The evaluation of the existing instruments reveals that these are largely inadequate, in scope or in depth, for delivering the necessary information to the consumer or benefitting from their involvement. A proposal has been made for strengthening mandatory labeling requirements as a means of mainstreaming sustainability concerns into consumer

decisions and food policy and enriching the sustainable seafood governance toolbox. The purpose was to flag this particular policy instrument, rather than present a full-fledged plan for its use across jurisdictions.

Assuming there is sufficient willingness for implementation of the policy commitments on sustainable consumption of seafood, future research in this area could further dedicate to the implementational aspects of the proposal. These are not only technical, but to a large extent also societal and political, encroaching on the issue of benefit sharing of all types of fisheries. From the regulatory point of view, an issue to consider is the interaction among various policy tools that operate alongside mandatory labeling. The proposal on enhancement of the mandatory labeling does not imply the need to replace or reduce other ongoing efforts that address the underlying causes for unsustainable fisheries. It can be complementary with other consumer-focused tools, such as retailers' sourcing policies or eco-labeling, as well as to governments' efforts, such as implementation of sustainable fisheries management plans and conservation measures, enhanced enforcement, or harmonization of trade and fisheries policies in free trade agreements. It is nevertheless important to envisage how they can effectively run in parallel (European Parliament, 2018). Further, it is important to anticipate that their interaction might change over time. In that context, relying on the consumer as a catalyst for the outcome of fisheries sustainability might well be a temporary measure. In the best-case scenario, or in the long-run, management of fisheries may improve to such an extent that it sharply reduces or even eliminates the need to involve consumers in the decisions regarding seafood marketing, and only effects the consumer's right to information.

One aspect that continues to require further attention is to explore systemic benefits of empowered citizen/consumer. This is strongly related also to the value of demonstrating leadership by certain governments in absence of a joint action. How far do educated citizens, capable of processing a certain amount of information, allow for a dynamic development of the markets and policy, in sync with the availability of new scientific information? It is certainly challenging to make ambitious policies, such as improving scientific engagement and investing in citizens' knowledge, succeed in an extreme information era where evidence does not necessarily trump. The study of consumers in the fisheries regime could form part of the broader endeavors to capitalize on a more transparent, participative, and deliberative kind of governance.

AUTHOR CONTRIBUTIONS

JP designed and conducted research, and wrote the manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fmars.2020.598682/full#supplementary-material>

Supplementary Figure 1 | Differences between mandatory labeling and eco-labeling regarding consumers' knowledge and decision-making.

Supplementary Figure 2 | Example of European Union requirements for labeling of unprocessed and pre-packaged products, Courtesy of Oceana, https://usa.oceana.org/sites/default/files/global_fraud_report_final_low-res.pdf, adapted from European Commission, https://ec.europa.eu/dgs/maritimeaffairs_fisheries/magazine/en/policy/more-transparency-consumers-new-rules-seafood-labelling-come-force.

Supplementary Figure 3 | A possibility for enhanced mandatory labeling for seafood.

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Conflict of Interest: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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